American Gas Association MONTHLY

Population Shifts During War

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Dehydrated Foods in Britain

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Occupational Deferment Data

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War Housing Utility Services

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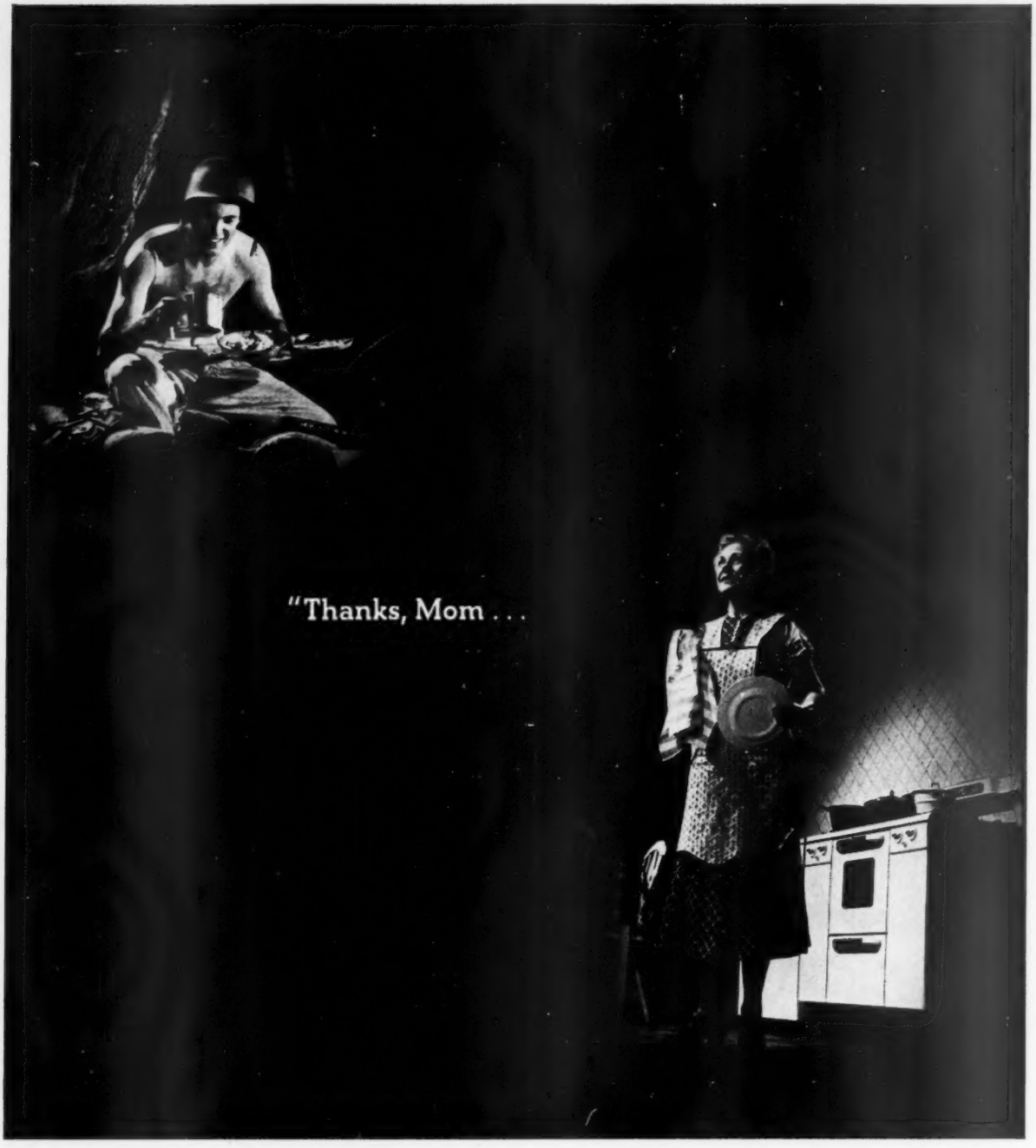
Organic Sulfur Research Plan

March 1943

VOLUME XXV NUMBER 3



"Thanks for all the things you do every day that will help bring me and the rest of the boys home sooner . . . When I see men out here giving their all for Victory, it's easy for *me* to understand why it's so important for the folks back home to sacrifice and do without. But *you,* Mom, are doing a swell job even though you're far away from this mess . . . and that makes me specially proud. Thanks for saving fats and greases . . . I hear them go off with an almighty bang every day. Thanks for saving food . . . I'm eating some of it now. Thanks for saving Gas at home . . . God knows we need the tanks and guns and planes that are produced with Gas. Honest, Mom, I think they should give medals to women like you who are fighting the good fight for freedom back on the home front!"

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GAS *is vital to war production . . . use it wisely!*

Buy War Bonds today—save for the Certified Performance Gas range of tomorrow

American Gas Association MONTHLY

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The gas industry is coming through a hard winter hitting on all cylinders. It has weathered some of the severest cold snaps within the memory of the Weather Bureau without dropping so much as a B.t.u. of service to war production plants. One reason has been wholehearted support of WPB's gas conservation program, for evidence of which see the ads reproduced on page 104 and similar pages in recent issues. . . . For a thoroughgoing analysis of wartime population shifts and a peak into the post-war marketing setup, read the lead-off article by Mr. Hauser. He's a brave man to stick his neck out and we hope local Chambers of Commerce won't be too hard on him. . . . A simple and effective method of showing the manpower picture at a glance for the enlightenment of local draft boards is presented by Mr. Ritenour. It brought results, too, because it gave the over-all facts. . . . That survey of utility services for war housing, as Will Rogers might say, "is mighty revealin'." It doesn't leave the competition many limbs to stand on. . . . Operating men can't afford to miss Dr. Guernsey's scholarly resumé of the organic sulfur problem which winds up this issue.

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"Cold bending" pipe by use of two side-arm caterpillars. Photographed by Ruth Canaday during construction of Oklahoma Natural Gas Company's new 12-inch line. This is Miss Canaday's third prize-winning photograph in the A. G. A. MONTHLY frontispiece contest.

American Gas Association MONTHLY

JAMES M. BEALL, *Editor*

MIGRATION

. . . U. S. Population Shifts Resulting from the War

By PHILIP M. HAUSER

Assistant Director, Bureau of the Census, Washington, D. C.

THE magnitude and direction of internal population movements have been vitally affected by the tremendous industrial conversion and expansion necessitated successively by the defense, lend lease, and war production programs. Despite the widespread interest in internal migration from the manpower, production, administrative, and marketing standpoint, there is a scarcity of information available on the number and characteristics of migrants and the direction of their movements. In order to meet urgent demands for some information on the subject the Census Bureau, although fully cognizant of the limitations of the data, has used figures on the number of registrations for War Ration Book One (sugar registration) conducted last May as a basis for a series of civilian population estimates for the States and large metropolitan areas.

Let us first turn to the consideration of population shifts on a divisional and State basis, as given in a release by Director J. C. Capt of the Census Bureau last October 27 (Series P-3, No. 30). On May 1, 1942, the total civilian population in the United States numbered about 131.3 million persons. This was almost identical with the civilian population at the last census, that is, on April 1, 1940, because the number of inductions and enlistments in the armed forces was approximately equal to combined natural increase (the excess of births over deaths) and net immigration.

Within the nation, however, the East North Central Division with a gain of approximately half a million persons between April 1, 1940 and May 1, 1942, showed the greatest absolute population increase while the Middle Atlantic Division, with a loss of over 600,000 persons, showed the greatest decline. On a percentage basis the Pacific Division had the greatest increase in population, 3.4 per cent, while the Mountain Division had the greatest decrease, 4.0 per cent.

The South Atlantic Division also showed a considerable increase in population during this period, registering a gain of almost 400,000 persons, while the West North Central Division showed a substantial decrease, approximately 480,000 persons. The New England, East South Central, and West South Central Divisions registered relatively little change in total civilian population in the two years under consideration. In general, therefore, the Pacific, South Atlantic, and East North Central States made considerable population gains as a result of the war at the expense of the Mountain, West North Central, and Middle Atlantic States.

It would seem that rural States lost population to urbanized industrial States, a generalization supported by the estimates of the Bureau of Agricultural Economics to the effect that the net movement from farms to cities increased from approximately half a million in 1940 to over a million in 1941.

This brief analysis of population shifts by States also obscures specific areas of increase and decrease. In fact, one of the outstanding characteristics of wartime population shifts in the United States has been the extent to which population increase has been concentrated in a relatively few metropolitan counties or groups of counties.[1]

Eighty-eight of 137 metropolitan counties or groups of counties for which estimates are available showed a gain in civilian population between April 1, 1940 and May 1, 1942, while 43 showed

- **Population shifts during peace or war, giving rise to distribution, production and marketing problems, are always of serious concern to gas industry management but the present movement resulting from the tremendous industrial conversion to war is unprecedented in modern times. For this reason, the accompanying study is noteworthy, representing as it does the first authoritative data on this subject since the war began.**
- **Abstract of an address before the Wartime Marketing Conference of the American Management Association in Chicago, January 15.**

[1] Metropolitan counties or groups of counties, that is, counties half or more of whose population were in metropolitan districts, are considered instead of metropolitan districts because sugar ration data were available only for counties.

a decline and 6 showed no appreciable change. The metropolitan counties which gained population increased by 2.6 million persons or by 6.8 per cent of their 1940 civilian population. Although the annual post-censal rate of increase of 1.3 per cent for all the metropolitan counties was appreciably greater than the 0.8 per cent annual rate of increase for the same areas between 1930 and 1940, it was considerably lower than the average annual rate of 2.7 per cent between 1920 and 1930. It is of some special interest to observe that the rapid rate of increase, experienced by metropolitan centers as a result of the war has not, on the average, come up to the increase of the 1920's.

Let us analyze the population changes in the metropolitan counties in the Northeastern, the North Central, Southern, and Western regions of the United States. The metropolitan counties in the South showed the greatest annual rate of increase in population between 1940 and 1942, 3.9 per cent, as compared with an annual rate of increase of 2.7 per cent in the West, 2.0 per cent in the North Central Region, and an annual rate of decrease of 0.6 per cent in the Northeast.

The metropolitan counties in the South, in fact, were the only ones in which the yearly rate of increase since the last census was greater than the yearly rate of increase both between 1930 and 1940 and between 1920 and 1930 (3.9 per cent as compared with 1.7 per cent and 2.9 per cent). Moreover, in the South the small metropolitan counties (those having central city populations of less than 100,000 or a total population of less than 150,000) had a higher annual rate of increase than did the large metropolitan counties, 4.1 per cent as compared with 3.9 per cent. In each of the other three regions, the large metropolitan counties grew more rapidly than did the small.

Great differentials in the rates of growth of individual metropolitan centers are evident in an examination of the preliminary estimates of civilian population in selected metropolitan counties, as of May 1, 1942, released by the Census Bureau on December 1, 1942. (Series P-3, No. 31.)

Very large gains in civilian population have taken place in the metropolitan counties of the following cities: Detroit, a gain of 336,000; Washington, D. C., 231,000; Chicago, 149,000; Los Angeles, 131,000; Norfolk, Portsmouth, and Newport News, 107,000; St. Louis, 97,000; San Diego, 97,000, and San Francisco and Oakland, 95,000. The largest percentage gains were recorded in the areas centering in San Diego; Norfolk, Portsmouth, and Newport News; Mobile; Corpus Christi; and Washington, D. C.—all of which had a civilian population gain of more than 25 per cent. The largest loss, 365,000, occurred in the New York-Northeastern New Jersey metropolitan counties.

These extreme changes and other shifts recorded in the release to which reference has been made are attributable mainly to net in-migration or out-migration rather than to natural increase or decrease. Metropolitan counties with high rates of growth were in practically every case those with more than average wartime activity, whereas those with heavy rates of decline were relatively inactive and contained relatively few important plants working on war contracts. The gains in civilian population were effected despite the substantial number of men who have entered the armed forces from every area.

Permanence or Transiency of Growth

Of especial interest to marketing executives is the answer to the question "Are these wartime population shifts temporary or permanent?" No one can answer this question with certainty, but one relatively simple criterion that can be applied in an effort to answer it is that of previously observed growth. To obtain at least a crude analysis of the relative permanence of the wartime population growth of metropolitan centers as measured by previous population increases, the average annual rates of growth of the 137 metropolitan areas studied have been arranged by quartiles for the periods 1920 to 1930, 1930 to 1940, and 1940 to 1942. The areas in the fourth quartile are those with the highest rates of growth; areas in the first quartile are those with the lowest rates of growth.

A comparison was then made of the quartile rankings of the three periods of growth under observation and the following four classes of metropolitan counties were distinguished:[2] First, those which grew relatively rapidly since the onset of the war and which in the light of previously observed rapid growth may be expected to retain their population increments; second, those which grew rapidly during the war but whose population increase in the light of previously observed small increases may be regarded as relatively temporary unless their wartime activities are converted to normal peacetime functions after the war; third, those which lost population or grew very

Shipbuilding has caused much re-settling of families. At this Gulf Coast shipyard where speedy cargo vessels are built, more than 5000 men cross this pontoon bridge in 30 minutes at the close of each working shift.

[2] Milwaukee and Montgomery (Alabama) counties were not classified because available figures are now being revised.

On the move

little as a result of the war, but which in the light of good past performance may be expected to "come back" in the post-war period; and fourth, those which decreased or gained very little during the war and which in the light of relatively poor past performance cannot be expected to grow rapidly in the immediate future. Within these broad classifications of metropolitan counties, it was possible, on the basis of differentials in growth rankings, further to stratify areas with respect to the probability of the predictions made.

Class A Metropolitan Counties

The first of these classes of metropolitan counties, those whose wartime growth has been rapid and which may be expected to retain their population growth, were made up as follows:

Class A-1 areas: Those which grew most rapidly during the war with the best prospects of retaining their wartime growth. (These are the areas which fell in the fourth quartile, that of most rapid population increase, in each of the three periods under observation.)

Corpus Christi, Texas
Dallas, Texas
Jackson, Mississippi
Jacksonville, Florida
San Antonio, Texas
San Diego, California

Class A-2 areas: Those which grew most rapidly with superior prospects of retaining their wartime growth. (These are the areas which fell in the fourth quartile in the last two periods of observation although they experienced relatively slow growth between 1920 and 1930). The classification of these cities as superior prospects to retain their wartime growth seems justified on the grounds that centers which grow rapidly in the face of the severe handicaps of the depression years as well as in the war period are "safe bets."

Charleston, South Carolina
Columbia, South Carolina
Columbus, Georgia
Mobile, Alabama
Washington, D. C.
Galveston, Texas

Class A-3 areas: Those which grew at above average rates consistently for each of the three periods under observation and which are assumed therefore to have excellent prospects of retaining their wartime growth. These are the centers which fell into the third or combination of third and fourth quartiles for each of the three periods considered.

Atlanta, Georgia
Austin, Texas
Beaumont-Port Arthur, Texas
Chattanooga, Tennessee
Detroit, Michigan
Fort Worth, Texas
Houston Texas
Kalamazoo, Michigan
Knoxville, Tennessee
Little Rock, Arkansas
Los Angeles, California
New Orleans, Louisiana
Nashville, Tennessee
Sacramento, California
San Francisco, California
Shreveport, Louisiana

Class A-4 areas: Those which grew at above average rates or most rapidly during the war period with good prospects of retaining their growth. These are areas with above average increase during the depression years in spite of economic handicaps, even though they grew relatively slowly between 1920 and 1930. (These centers fell in the third or fourth quartiles in the last two periods under observation, and below those quartile rankings in the first period.)

Augusta, Georgia
Baltimore, Maryland
Davenport-Rock Island, Moline (Iowa & Illinois)
Denver, Colorado
Evansville, Indiana
Indianapolis, Indiana
Macon, Georgia
Norfolk-Portsmouth-Newport News, Va.
Portland, Maine
Richmond, Virginia
Salt Lake City, Utah
Savannah, Georgia
Seattle, Washington
Tacoma, Washington
Wilmington, Delaware

Class A-5 areas: Those which grew at above average rates in the war period with fair prospects of retaining their wartime growth. These are areas of moderate or rapid increase in at least one of the preceding two periods. (The centers in this list fell in the third quartile of growth in the war period, at least in the second quartile during the depression period, and the second or third quartile between 1920 and 1930.)

Canton, Ohio
*Chicago, Illinois
Cincinnati, Ohio
Columbus, Ohio
Decatur, Illinois
Fort Wayne, Indiana
Hamilton-Middletown, Ohio
Portland, Oregon
Pueblo, Colorado
St. Louis, Missouri
Springfield, Ohio

*Chicago fell into the first quartile between 1930 and 1940.

Class B Metropolitan Counties

The second class of metropolitan counties, which we may term Class B areas, were those which grew rapidly during the war but whose growth may be transient unless their wartime activities are successfully converted to normal peacetime functions. These areas may be divided into two groups.

Class B-1 areas: Those with most rapid wartime growth whose growth, although far above that of the depression years, exceeded by little, if any, their 1920-1930 growth rankings. (These are centers which fell in the

Another reason why some communities have registered phenomenal population gains. Here is part of the day shift leaving one of Lockheed Vega's nine gates at main aircraft-building plant. Note high proportion of women workers.

fourth quartile of wartime growth, in the first or second quartile of depression growth, and in the third or fourth quartile of growth between 1920 and 1930). Metropolitan counties in this class, in the light of their relatively rapid growth between 1920 and 1930, may perhaps be easier to convert to normal peacetime functions than the Class B-2 centers below.

Birmingham, Alabama
Dayton, Ohio
El Paso, Texas
Hartford-New Britian, Conn.
Rockford, Illinois
Tulsa, Oklahoma
Wichita, Kansas

Class B-2 areas: Those with above average or most rapid wartime growth whose relative growth was far above that in either of the preceding two periods of observation. (These are centers in the third or fourth quartiles of wartime growth and in the first or second quartiles of growth between 1930 and 1940 and between 1920 and 1930.) The relatively low growth rankings of these areas during the 20 years preceding the war, indicates that it may be relatively difficult to convert their wartime functions to normal peacetime activities.

Bridgeport, Connecticut
Johnstown, Pennsylvania
Louisville, Kentucky
New Haven, Connecticut
Akron, Ohio
Waco, Texas

Class C Metropolitan Counties

In the third class of metropolitan centers, Class C, are those which lost population during the war or which barely held their own, but which in the light of past performance may be expected to "come back" in the postwar period. These metropolitan counties may be divided into three classes.

Class C-1 areas: Those which lost population during the war period with excellent prospects of "coming back" because of previously observed above average or most rapid rates of growth. (These are the centers which fell in the first or second quartiles of wartime growth but in the third or fourth quartile of growth during the preceding two periods of observation.)

Amarillo, Texas
Asheville, North Carolina
Binghamton, New York
Charleston, West Virginia
Charlotte, North Carolina
Lansing, Michigan
Oklahoma City, Oklahoma
Peoria, Illinois
Stockton, California
Winston-Salem, North Carolina
Miami, Florida

Class C-2 areas: Those which gained very little or barely held their own with excellent prospects of "coming back" because of previously observed above average or most rapid rates of growth. (These are the centers which fell in the second quartile of wartime growth but in the third or fourth quartiles of prewar growth.)

Durham, North Carolina
Madison, Wisconsin
Memphis, Tennessee
Phoenix, Arizona
San Jose, California
Tampa-St. Petersburg, Florida
Waterloo, Iowa

Class C-3 areas: Those which lost population or gained very little during the war period which have fair prospects of "coming back" because of an above average or most rapid rate of growth during at least one of the two preceding periods. (These are the centers which fell in the first or second quartiles of wartime growth but in the third or fourth quartiles of growth between 1930 to 1940 or 1920 to 1930.)

Cedar Rapids, Iowa
Des Moines, Iowa
Flint, Michigan
Fresno, California
Huntington (W. Va.)-Ashland (Ky.)
Minneapolis-St. Paul, Minnesota
New York-Northeastern New Jersey
Roanoke, Virginia
Spokane, Washington
Springfield, Missouri
Topeka, Kansas
Youngstown, Ohio

Class D Metropolitan Counties

Finally, in the fourth class of metropolitan centers, Class D areas, are those which decreased during the war or gained very little, and which in the light of past performance seem to be relatively stable—that is, cannot be expected to grow rapidly in the immediate future. These metropolitan counties can be divided into three classes (the first of which may well belie the class into which they have been put).

Class D-1 areas: Those which lost population or grew very little during both the war and the depression but which grew at an above average rate or most rapidly between 1920 and 1930. These areas are difficult to evaluate and may well belie their allocation to this class. (These are the centers which fell in the first or second quartiles during the war and the depression years but in the third or fourth quartiles between 1920 and 1930.)

Atlantic City, New Jersey
Cleveland, Ohio
Grand Rapids, Michigan
Kansas City (Mo.)-Kansas City (Kan.)
South Bend, Indiana

Class D-2 areas: Those which grew very little or not at all during the war and which in the light of past performance have little prospect of rapid postwar growth. (These are the centers which fell in the second quartile of wartime growth and the first or second quartiles of growth in the preceding two periods of observation.)

Allentown-Bethlehem-Easton, Pennsylvania
Buffalo-Niagara, New York

(Continued on page 122)

New WPB Order Controls Materials Flow

THE Office of War Utilities, recently created within the War Production Board to administer war activities of electric, gas, water, steam and communications utilities, issued its first basic order February 24 governing the flow of materials into the entire utilities field with the exception of communications.

The order, U-1, replaces the former order P-46 and is the first industry order to be integrated with the new controlled materials plan.

An important group of provisions, designed to affect sharing of material and equipment in utility inventories, requires utilities to sell surplus stocks as a condition for continuing to receive priorities assistance. These provisions are linked with the creation of regional surplus stock offices, to be in operation throughout the United States in March, through which utilities will carry on the redistribution of their surplus materials and equipment.

The order also authorizes the use of a higher rating, AA-1, and a controlled materials plan allotment symbol, to permit utilities to obtain materials for maintenance, repair and minor construction. The order also, for the first time, brings under inventory regulation stocks of controlled material held by utilities for construction. Utilities are required to limit such holdings to their needs for sixty days.

The order sharply reduces the inventory which may be held for maintenance and repair after March 31.

Food in Britain . . . *Dehydration Takes Its Place as a Major Wartime Achievement*

- **In the February issue of the MONTHLY, H. F. Heisterkamp told how the dehydrated food industry has grown in America and explained why gas is the perfect fuel to use in this process. Herewith Mrs. Murphy, presents an authoritative account of the widespread consumption of such products in England.**
- **This article is based upon information contained in a letter received January 19, 1943 by Davis M. DeBard, vice-president, Stone & Webster Service Corp., New York, N. Y.**

By Mrs. Eileen Murphy

Home Service Director, The British Commercial Gas Association

NOT the invention of any one man, dehydration has grown from much scientific research based on one simple principle, the removal of water—and consequently bulk—from produce. Pre-war Britain imported something like three million tons of water a year as part of her foodstuffs. Today when utmost economy in transport is so essential, dehydrated foodstuffs not only make possible large savings in weight and volume, they also eliminate storage under refrigeration.

In Britain, only dehydrated vegetables so far are produced on a large scale commercially. Large quantities of dehydrated eggs, milk and some meat are imported.

The present process of dehydration is new, although the idea of dried food is very old. The first practical example of dehydration on a large scale during the war, was the storage of blood for transfusion purposes. The application of this process to food has been an easy advance.

The Department of Scientific and Industrial Research at the Low-Temperature Research Station in Cambridge has made much recent progress concerning the pre-drying treatment of general foodstuffs, conditions during drying, and methods of packing. Fifteen plants are being set up by the Ministry of Food for the dehydration of fresh vegetables, and the number is to be increased. The annual capacity of these plants is estimated at 7,500 tons of mixed dried vegetables, and for this, approximately 140,000 tons of fresh vegetables, mainly potatoes, carrots and cabbage will be required. This quantity is being grown by British farmers under a scheme of co-operation with the Ministry of Agriculture and National Farmers' Union.

Dehydration of Vegetables

All vegetables undergo the same treatment fundamentally, merely the initial stages of preparation vary. In the case of potatoes, they are peeled by machines, then passed on to tables where "eyes" and blemishes are removed by hand. They are well washed from time to time by girls who move about on the wet floor, clad in overalls and gum boots. A shredding machine will reduce batches of 30 lbs. of potatoes to small chips in a few seconds, and will take continuous batches. By immersion in boiling water for two minutes and a sudden cooling the chips are blanched—this process assures the retention of ascorbic and of Vitamin C. They then pass to the drying proper in a tunnel heated by steam with wet and dry ends and respective top temperatures of 200° and 150° F. It takes seven hours for the chips to pass through this tunnel. Finally, the golden colored crisps produced are ready for packing in 9 lb. tins, from which all air is expelled to be replaced by nitrogen. Should testing in a bath of water reveal leaks, the soldering iron is again applied.

Cooking of Dehydrated Vegetables

The cooking of dehydrated vegetables is much the same as for fresh ones, except less water and less time are needed. Dehydrated cabbage need not be soaked before cooking, other vegetables should be immersed in boiling water and left to stand for one hour before cooking. They should then be cooked for 20 minutes and the result when strained is indistinguishable in appearance, color and flavor, from fresh mashed vegetables.

Retention of Vitamins

The calorie value or fat content of foodstuffs is not affected by dehydration, and the following is generally true in reference to vitamin content of dehydrated vegetables:

Vitamin A. No loss
Vitamin B. Very slight loss
Vitamin C. Up to 20%

When fresh cabbage is cooked it can lose anything up to 50% of Vitamin C, as this crystallized substance dissolves in water and is usually thrown down the kitchen sink. When dehydrated it loses only about 8%. This is due to the blanching process in drying, which kills the agent that destroys Vitamin C.

Eggs—When dehydrated by a new process known as "spray dried" instead of the old method known as "roller dried," no vitamins are lost. This method allows eggs to be liquefied and beaten up and sprayed into a vacuum chamber. The Ministry of Food decided to import 80,000 tons

of dried eggs instead of 2,100,000 tons of feeding stuffs required to produce their equivalent in shell eggs. About 80% of the current allocation of dried eggs has now reached the retailers, and is distributed at the rate of one package of 12 eggs per ration book every two months. Dehydrated eggs can be scrambled, made into an omelette or used with other ingredients in cooking.

Milk—If spray dried there is very slight loss of vitamins. When opened this milk will keep fresh as long as normal milk, but as it mixes with atmosphere about 20% of its value is lost. The bulk of milk powder distributed now is of United States origin, with small quantities from home production. The owner of a ration book is allowed 1 tin (4 pints) every two months. This milk when mixed with water can be used as ordinary milk.

Meat and Fish—Research shows that when these are dehydrated very little nutriment is lost, probably about the same as in normal cooking. As research work on these foodstuffs is still in its early stage scientists hesitate to commit themselves to definite statements. Neither of these foodstuffs is as yet used on a large scale.

Recently, the British public had an opportunity to taste dehydrated mutton. One hundred selected catering establishments served dehydrated mutton which had been supplied free by the Ministry of Food for the purpose of recording people's reactions. Owing to its minced form, the meat was served in such dishes as Shepherds Pie, meat patties, rissoles and Hamburger steaks. The experiment was a success. At Brighton in a restaurant where diners were asked to taste both minced fresh mutton and the dehydrated variety, a larger proportion of people preferred the latter.

How great is the compression achieved by dehydration and the consequent saving of shipping space and transport and weight may be indicated by the following figures:

Dried Product Compared with	*Weight Saved*	*Volume Saved*	
		(a) Compressed	*(b) Not Compressed*
Potatoes. Raw veg.	87.5%	85%	57.5%
Carrots "	93%	94.5%	81%
Cabbage "	96%	98%	88%

Dehydrated Food Needs

Government dehydrated food requirements during the 1943-1944 fiscal year will total 1,750 million pounds, including 400 million pounds of vegetables. To meet the new goal, the industry must add 200 new plants, find as much raw food stuff as was used by all U. S. canneries in 1942. The need, in pounds: White potatoes, 135 million; onions, 25 million; cabbage, 35 million; carrots, 13 million; beets, 25 million; turnips, 9 million.

Yam Dehydrated with Gas*

As a small boy, Gilbert C. Wilson helped his father eke out a living on a tenant farm in the deep sands of the East Texas piney woods and saw tons of sweet potatoes thrown to the hogs because of glutted markets and ruinous prices.

His sons will be spared that experience for, thanks to him, a dozen new end uses for the humble yam have been developed, not the least of which is a dehydration process that is supplying energy-building food to the armed forces.

In fact, Wilson's sweet-potato chips, vitamin A flour, and diced yams have made such a hit with the Army that the government monopolizes the entire output of his two plants in Texas and ships his tinned products to every fighting front.

When military demand lets up, watch the yam spring into prominence as a cattle feed crop, another of the uses to which the researches of this 31-year-old chemistry teacher and his classes have led. Other yields of their study include a root starch which they believe can compete with the finest cassava imported from Java, sirup, dextrose sugar, ethyl alcohol, acetic acid, pectin, furfural, cellulose, and a rubbery plastic.

Wilson's research began in 1938. A raw graduate of North Texas State Teachers College at Denton, he was teaching chemistry at a country high school at White Oak, in the center of a great oil field. One of Wilson's first steps was to put his class to work on the secrets of the sweet potato. How assiduously they attacked the assignment is attested by the results that they have achieved. Many in the class since have risen to prominence as dehydration engineers.

When he returned three years ago to North Texas State Teachers College as instructor in chemistry, Wilson and his students erected a pilot dehydration plant near Denton. With their own hands they built the walls of rammed earth and assembled the odds and ends of machinery they were able to buy, beg, or borrow.

Soon after the pilot plant began turning out dehydrated sweet potatoes the Army's interest was aroused. After a minute inspection of the process, the Quartermaster Corps ordered 250,000 lb., followed this order quickly with one for several millions. Wilson obtained a loan from the Reconstruction Finance Corporation to double the capacity of the Denton plant and a second loan to build a $250,000 dehydration plant at nearby Pittsburg, the sweet-potato capital of East Texas. Together the plants have a processing capacity of 400 tons of raw yams a day.

Wilson began his experiments with a homemade roller press and canvas belts, and a revolving drum heated by a flame of natural gas. In his new plant he also uses tunnel types of dryers.

The future of the dehydrated sweet potato as a cattle feed seems assured. In nutritive value, it is the pound-for-pound equal of No. 2 yellow corn. The South's sandy land yields only 10 bu. to 15 bu. of corn per acre, compared with as much as 60 bu. to 100 bu. per acre in Iowa or Illinois. But the same sandy soil will yield 200 bu. to 300 bu. of sweet potatoes, which when dehydrated, amount to 70 bu. to 100 bu. of concentrated feed equal to corn. It means a new carbohydrate feed crop for Dixie.

* Reprinted from "Business Week," January 30, 1943.

Natural Gas Management Conference

THE chairman of the National Gas Section of the American Gas Association, Burt R. Bay, has announced a Natural Gas Management Conference to be held in the Gibson Hotel, Cincinnati, Ohio, on Wednesday, April 28.

As the name of the conference implies, the program for the one-day meeting will deal with major managerial problems in connection with the war emergency and the discussions will be directed by officials of the natural gas industry and by officials of Government agencies.

An outline of the program will be announced at a later date.

Mystery Chef Returns on Nationwide Network with Gas Company Sponsors

By JUDITH CORTADA, *The Blue Network*

The Mystery Chef

A SOFT-SPOKEN Scotsman whose quiet voice has called thousands of housewives to their radio sets, "the best radio friend the gas industry ever had," has returned to the microphone to assume again his anonymous role as the "Mystery Chef." His 15-minute program, heard daily at 2:15 P.M., EWT, on the Blue Network, has already attracted two gas companies as sponsors.

The "best radio friend" of the gas industry, so termed by an executive of the American Gas Association, won that reputation during the three years beginning in 1935 when he was presented on an NBC network by 110 member companies of the Association. A convincing radio personality, whose religious convictions and belief in the sanctity of the home lifted his program above the level of the ordinary "recipe talks," the Chef succeeded for the first time in several years in arresting the trend away from cooking with gas.

Made Gas Fashionable

His daily talks over the three years left his listeners firmly convinced that gas was the most modern of all fuels. The Chef knew the gas industry's problem as well as he knew human nature and the methods he used to overcome the prejudice against gas were worthy of a good psychologist. For example, realizing that a woman will cook with a certain fuel for the same reason that she takes to a certain fashion, he called attention to the fact that the 31 restaurants of Radio City, the most modern of real estate developments, used gas exclusively.

As the president of one of the sponsoring gas companies wrote when the Chef went off the air, "it is futile to try to measure your contribution to the industry." During the life of the broadcasts, 2,200,000 copies of the Chef's recipe book "Be An Artist at the Gas Range" and 625,000 copies of his supplemental folder of recipes were distributed to persons obliged to call in person for them at the offices of the participating gas companies. As the letter from the A. G. A. executive pointed out, "this tremendous response to the offer of the recipe book and supplement, the thousands of additional requests made for the Chef's $4.00 a week menus for four persons, the mounting mail from listeners and the results reported by the gas companies themselves all bear out the statement that the program was as strong at its finish as at any time during its three years of use."

Today the "Mystery Chef" confronts a different set of problems, the difficulties raised by the wartime rationing of foods and rising prices. But no food problem will stump the man who learned to cook when he came from Scotland to the United States and found restaurant fare too expensive. The "mystery" surrounding his name, still unknown to his radio admirers, stems from a fear of his well-to-do family that their friends would learn of his furnished room and home-cooked meals when he first came to the United States.

The Chef's daily broadcasts, concentrating on the point-rationing system and the best methods of beating soaring prices, are available for local sponsorship on all affiliates of the Blue Network. A unique arrangement makes it possible for the Chef himself to endorse personally the local sponsor's product in the course of a net work broadcast.

Since January 18, when the program was made available, 17 companies in varying fields have signed up as sponsors. Among them are the two gas companies, Jacksonville Gas Company, Station WJHP, Jacksonville, Fla.; and Sioux City Gas & Electric Company, Station KSOG, Sioux City, Ia.

Sailor in National Gas Ad Turns Out To Be Real Thing

Yeoman Clark of Peoria

THERE'S more than meets the eye in that appealing illustration, reproduced here, from one of the recent national gas advertisements. In support of which, we quote the following story which appeared in *The Peoria Star,* December 27:

"All Peorians who join the Navy are undoubtedly model sailors, but not every Peoria sailor can be a model.

"The honor and distinction has, however, fallen to Les Clark, yeoman, third class, son of Mr. and Mrs. L. B. Clark, 1027 West Wilcox Avenue, shown in the accompanying picture. Many of his friends have seen this same picture in recent issues of *Collier's* and *The Saturday Evening Post,* illustrating advertisements on gas conservation.

"The cute youngster at the left is the daughter of the University of Vermont president, Les wrote his mother, and the lady, center, is a Mrs. French, wife of a leading architect in Burlington, Vt. How Les came to be chosen for the dominating masculine role, he did not explain, but the choice was a happy one.

"Les was a Peoria Star carrier boy during his high school days, and up to the time of his graduation from Peoria High School in June, 1941. He joined the Navy Jan. 5, 1942, and is now serving aboard a subchaser with the Atlantic fleet.

"A painting was made from the accompanying photograph for use in the advertisements."

Adjustments of British Utility Rates

IN a letter to Davis M. DeBard, vice-president, Stone and Webster Service Corp., dated December 18, 1942, Michael Milne-Watson, vice-president of the British Gas Light and Coke Company, London, provides the following reply to the question "Have utilities been able to adjust their rate structures to compensate the rising costs?"

"Under the Defense (Gas Charges) Order, 1941, no increase in the price of gas may now be made except under license from the Ministry of Fuel and Power. This licence is granted only after Government auditors have made fullest investigation of the company's accounts. Three price increases have been made by this company since the war broke out. One in November, 1939, and two under licence. The first licence was granted in February 1942, the second in August 1942. Just before the war, for gas in the Central Area, British Gas Light and Coke Company charged 19¢ per therm. This was raised in November 1939, to 24¢; in March 1942 to 27¢, and in August 1942 to 28¢ per therm. These increases in the price of gas were related entirely to the cost of manufacture and applied to gas supplied to industry as well as to domestic users."

Occupational Deferment for Accountants

By O. H. RITENOUR

Comptroller, Washington Gas Light Company

Published at the suggestion of the A. G. A. Committee on Personnel Practices as a typical example of the resourcefulness shown in coping with the manpower problem

O. H. Ritenour

WINNING THE WAR IS TASK NUMBER ONE. Other matters are incidental. One incidental is the proper allocation of strength between the fighting front and the home front. It is recognized that certain trained men are more valuable in essential industry than in combat. Such men should remain in their jobs—and probably will if the facts are properly presented.

The utility industry is in the essential class and the list of those eligible for occupational deferment includes accountants as well as mechanics. Of course, this does not mean that all utility accountants should be excused. If proper balance is to be maintained, however, deferment must be granted to a limited number. No single individual is indispensable, but a nucleus of those who "know how" *is* essential. The deferment problem, therefore, must be considered from the standpoint of the organization as a whole rather than that of the specific individual involved.

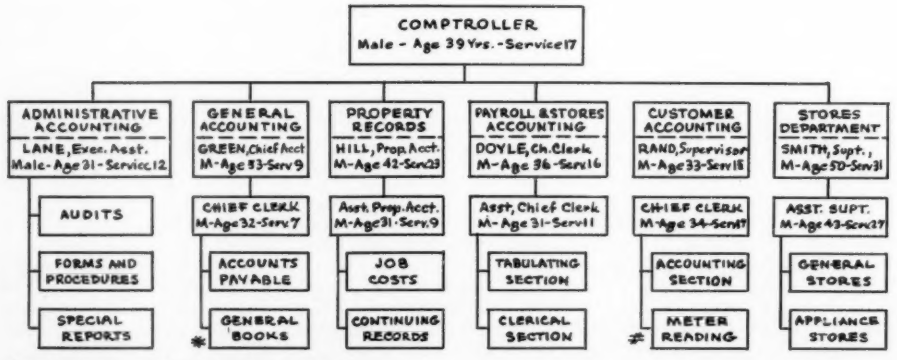
Selective Service Boards must discharge a serious responsibility under difficult circumstances. Deferments should be requested only if fully justified. In such cases we should be prepared to present the facts in a clear concise manner.

The accompanying charts present the story of one utility accounting department for the first year of the war. This department is highly mechanized and was staffed with a high percentage of well-trained but relatively young men. On December 1, 1941, the office personnel totaled 162 (102 men and 60 women). As of February first this year, 54 were in the armed forces and it is probable that approximately 30 of the remainder will be called in 1943. These charts were prepared to show these facts to a local draft board in support of our request for deferment of thirteen accountants, four of whom happened to be registrants of the particular board.

The organization chart (Exhibit 1) shows the relative importance in the organization of the positions of the registrants for whom deferment was requested. (Their names were clearly

Exhibit 1—Manpower chart. To conserve space, only essential elements are shown here. Actual chart was in typewritten form and contained further breakdown of personnel as indicated in right-hand column

ORGANIZATION CHART
ACCOUNTING & STORES DEPARTMENT
NOVEMBER 30, 1942



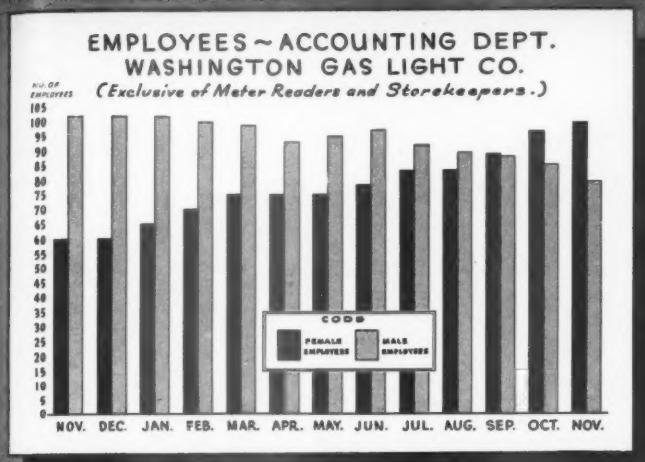
EMPLOYEES IN STORES DEPARTMENT AND METER READING SECTION ARE NOT INCLUDED IN STATISTICAL SUMMARIES OR GRAPH (EXHIBITS 2 & 3)

* Example of Detail shown on chart for each section

GENERAL BOOKS

H. L. BROWN, Supervisor
Male - Age 32 YRS - Service 12

NAME	SEX	AGE	SERVICE YRS	SERVICE MOS.
DEAN	M	32	10	
BUNN	M	29	9	
WALSH	M	26	8	
COX	M	31	5	
WARD	M	25	2	
SMITH	M	19	1	
JONES	M	28		2
NAIL	M	18		1
BROWN	F	35	17	
HART	F	39	10	
DOYLE	F	27	7	
BURCH	F	25	6	
PITTS	F	25	5	
FRANK	F	21	2	
CRIBB	F	26		10
MOORE	F	21		8
PRICE	F	28		5
PAGE	F	19		4
NEAL	F	28		3
HALL	F	26		2
BROOKE	F	29		2
AVERAGE		26.5		4.0


EMPLOYEES ~ ACCOUNTING DEPT.
WASHINGTON GAS LIGHT CO.
(Exclusive of Meter Readers and Storekeepers.)
NO. OF EMPLOYEES
CODE
FEMALE EMPLOYEES
MALE EMPLOYEES
NOV. DEC. JAN. FEB. MAR. APR. MAY. JUN. JUL. AUG. SEP. OCT. NOV.

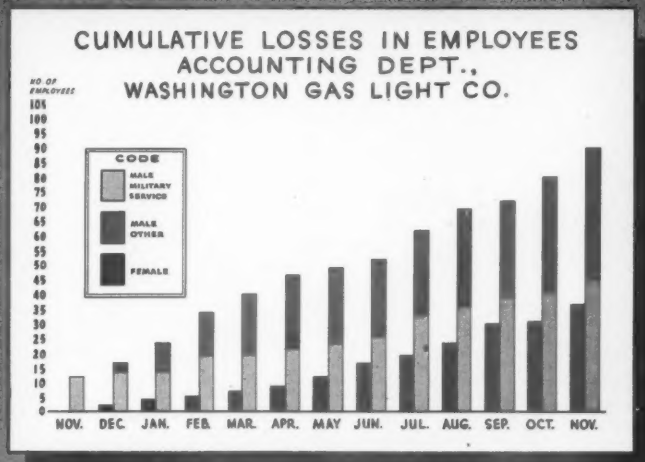


Exhibit 2—Charts showing month by month shift from male to female employees and cumulative effect

marked on the copy presented to the Board.) This chart also shows the large number of new employees; thereby dramatizing the need for adequate training and supervision. Exhibit I could be called a "balance sheet," as it presents a picture of the organization at the end of one year of war.

A cumulative "operating statement" was constructed in chart form (Exhibit 2) to portray graphically the month by month shift from male to female employees and the devastating cumulative effect of separations. The reduction in the number of male employees is evidence of the effort being made to free men for the armed forces.

The statistics upon which the chart is based, together with an analysis of the reasons for separations are shown in Exhibit 3. It was actually necessary to train 142 persons to obtain a net increase in total personnel of 16!

Reports and records have been eliminated or condensed to the extent feasible; however, relatively inexperienced girls are now handling a greater volume of work than was handled previously by experienced graduate accountants. The increased volume is due principally to a variety of new records and reports, such as are required by WPB, OPA, Victory Tax, etc., also an increase in customers. All large mechanical equipment has been "pooled," hours have been increased and three shifts are operated where feasible.

Despite pronouncements to the effect that an accountant may be as essential to a company as a production man or a mechanic, it is understood that some difficulty is being encountered in obtaining deferments of essential men. Our experience has shown that charts such as these, supported by sound statistical evidence, are an effective means of presenting the problem in a convincing manner.

STATISTICAL ANALYSIS

	Total Employees	Deferments Desired	Employees Lost: Military Service	Employees Lost: Other Reasons*	Per Cent in Military Service: Total Men (102)	Per Cent in Military Service: Total Employees (162)
1941—Nov.	162		12		11.8	7.4
Dec.	162		13	4	12.7	8.0
1942—Jan.	167		14	13	13.7	8.6
Feb.	170		19	19	18.6	11.7
Mar.	173		19	28	18.6	11.7
Apr.	168		22	34	21.6	13.6
May	170		23	38	22.5	14.2
June	175		27	41	26.5	16.7
July	175		33	48	32.3	20.4
Aug.	172		36	56	35.3	22.2
Sept.	175		39	63	38.2	24.1
Oct.	181		41	70	40.2	25.3
Nov.	178	13	46	80	45.1	28.4
			(a)		(b)	(c)

(a) On February 1, 1943 this figure had increased to 54%.
(b) On February 1, 1943 this figure had increased to 53%.
(c) On February 1, 1943 this figure had increased to 33%.

EMPLOYEE TURNOVER

	Men	Women	Total
Number of Employees, 11/30/41	102	60	162
Training Effort:			
Replacement of Employees Lost	90	36	126
Increase in No. of Employees	—23	39	16
	67	75	142
Training Effort in Terms of Number of Employees, 11/30/41	65.7%	125.0%	87.7%

*REASON FOR TERMINATION OF EMPLOYMENT

	No. of Employees
Home Duties	7
Health	4
Leaving City	6
Other Employment	21
Returning to School	3
Transfers to Other Company Divisions†	24
Miscellaneous	15
Total	80

† "Reshuffling" in an effort to make the best use of available personnel in filling vacancies—does not include intra departmental transfers.

Exhibit 3

Dean of Natural Gas Men Passes at 80

W. H. McKenzie

WILLIAM H. McKENZIE, vice-president and general manager of the Wyandotte County Gas Company, Kansas City, Kans., widely known as the dean of American gas men, died February 13 at the age of 80. He guided the destinies of the Wyandotte company for 55 of its 58 years.

One of the founders of the old Natural Gas Association of America and a past president of that association, Mr. McKenzie was a leader of the industry for well over half a century. He completed 66 years active duty in the gas industry last summer, having started work in a manufactured gas company at the age of 14.

Born in Harrisonville, Ohio, November 15, 1862, Mr. McKenzie had complete charge of the gas plant at Xenia, Ohio, when 16 years of age and at 18 attended his first national gas convention. From 1882 until 1886 he was general foreman of The United Gas Improvement Company's plant at Burlington, Iowa, where both water and coal gas were manufactured.

It was in 1886, the year that America's first natural gas pipeline was completed, that Mr. McKenzie was sent to The Wyandotte County Gas Co., then owned by U.G.I. The company switched over from manufactured to natural gas in 1905, and Mr. McKenzie's progress kept pace with the rapid advance of this pioneering company.

Critical Occupations in Gas Industry

NATIONAL headquarters of the Selective Service System issued and released to local draft boards on January 28, 1943 a revision of its Occupational Bulletin No. 9 which is in effect the official critical list of occupations in the gas industry. The Committee on Personnel Practices of the American Gas Association, at the request of the Committee on War Activities, cooperated in the compilation of the occupational information used in the revision.

Bulletin No. 9 is entirely separate from Occupational Bulletin No. 15 issued August 5, 1942, covering "Petroleum, Natural Gas and Natural Gasoline Activity," though in part the occupations are common to both.

In order that the critical occupations included therein might be of maximum value to member companies in securing necessary occupational deferments, some alternate titles used in the gas industry and the complete official definitions were distributed in the Feb. 1 A. G. A. Information Service Letter, in order to assist companies in identifying their essential jobs with those on the official list. The occupational titles on the official list are suggestive and indicative of the type of jobs which the Selective Service System considers essential.

In addition to Occupational Bulletin No. 9, another bulletin which should prove of value in obtaining deferments for mechanics and maintenance men is Occupational Bulletin No. 42, issued December 22, 1942, covering "Repair and hand trade services."

Big Inch Oil Line in Operation

THE first 530-mile section of the War Emergency Pipeline to transport oil to the Eastern seaboard was placed in actual operation February 19 with dispatch of the first railroad tank car train of crude oil from the loading racks at Norris City, Illinois.

Loading and dispatching of the cars eastbound to an Atlantic Seaboard refinery followed start of work on the construction of the Texas-Illinois segment by exactly 200 days.

Thousands of veteran pipeliners already are busily engaged in extending the big twenty-four inch line from its present terminus at Norris City to the East Coast. Completion of the extension is scheduled in June. Meantime, oil delivered in Illinois from Texas at the rate of 300,000 barrels daily will be trans-shipped to the seaboard by rail.

Brief ceremonies and a radio broadcast, in which Petroleum Administrator for War Harold L. Ickes participated from Washington, marked the formal placing of the Texas-Illinois section in operation.

There were brief talks at Norris City by Deputy Petroleum Administrator Ralph K. Davies; W. Alton Jones, president of War Emergency Pipelines, Inc., builders of the government-owned line; and by B. E. Hull, vice-president of War Emergency who supervised the project's construction in the field.

March Calendar of War Campaigns

CAMPAIGNS which will be promoted by retail stores in March on a national scale have been announced by the Retail War Campaigns Committee. It is suggested that gas companies in their local window and store displays and advertising promotion tie up with these national themes to improve the effectiveness of their appeals.

The theme for the month of March is "Your Family's Budget and the War." Here is the lineup of the campaigns:

March 1-14 Food Sharing, Victory Gardens

March 15-31 General Conservation Campaign

A nationwide feature in March will be the Red Cross campaign and all companies are urged to support this movement. There will also be a month-long campaign of the Treasury Department for the promotion of War Stamps and Bonds.

New Pipe Line Will Augment Gas Supply in Cleveland Area

FUEL protection for war plants and domestic consumers in Cleveland and northern Ohio was reinforced Feb. 9 when The East Ohio Gas Co. completed arrangements to obtain 50 million cubic feet of natural gas daily from Texas.

Under terms of a new five year contract with the Panhandle Eastern Pipe Line Co., Panhandle will bring the gas as far as Maumee, O. A new 20 inch pipe line will be built by East Ohio from Maumee to a point near Brecksville, where it will connect with the regular lines of East Ohio.

The new pipe line, which will be 120 miles long, is expected to cost more than $3,000,000. J. French Robinson, president of East Ohio, has applied to the War Production Board for approval of the line. It will require about 22,000 tons of steel.

War production in the Cleveland area is so important and the need for more gas so acute that it was believed the WPB would approve the request.

Panhandle, which also delivers Texas natural gas to Detroit and other cities, will distribute its quota to the East Ohio during the summer months when demands are at a minimum. East Ohio will then store the gas in partly-depleted wells for use during peak demand days in the winter season.

East Ohio now obtains most of its gas from the Hope Natural Gas Co. of West Virginia, for which it pays 29 cents per 1000 cubic feet at the Ohio River. It will pay Panhandle 27.75 cents at Maumee.

According to East Ohio officials, however, "this gas, after being handled, stored and repumped into the company's transmission system, will cost substantially more than the price which the company is now paying Hope.

East Ohio is already building a large compressing station, known as Robinson Station, to pump this gas back into wells and to pump it into the transmission lines on cold days.

Utility Services for War Housing

Proposals for Minimum Use of Materials of a Critical Character

- **For the purpose of providing member gas companies with information on critical materials for war housing and of assisting the War Production Board, the National Housing Agencies, and other interested Government groups in the saving of strategic war materials, the A. G. A. Committee on Critical Materials for War Housing made the study reported in this article. The material was taken directly from the complete report which is being distributed to member gas companies.**
- **This study presents an analysis of the requirements for materials for utility services based on a typical housing project of 500 homes. It is significant that the use of gas for cooking, water heating and house heating supplied by high presssure gas distribution was found to require 22% less weight of metal than other combinations of household services using electricity and coal.**

Prepared by Committee on Critical Materials for War Housing, C. GEORGE SEGELER, Chairman

THE Committee on Critical Materials for War Housing was appointed at the request of the Committee on War Activities to study the ways and means of providing vital services to war housing with a minimum possible use of materials in accordance with current Utility Housing Standards of the War Production Board. The committee recognized that many other considerations besides weight of materials would be involved in the actual selection of specific services, but the lack of authentic data, checked by responsible experts in the various fields involved, indicated the desirability of furnishing the War Production Board and the National Housing Agencies and other Government agencies with factual data that would be of assistance in arriving at the best war designs for specific projects. These methods do not necessarily conform to normal peace time utility standards under which weights of materials may be of secondary importance.

General Application

Although the report is based on a study of 500 individual homes laid out as semi-detached houses, the unit figures would be of general applicability to other war housing layouts. Although total weights of materials might thus be varied, the relative weights for various utility schemes will remain essentially unchanged.

To aid in visualizing the significance of various details of utility schemes for war housing, using gas, coal, kerosene, and electricity, this report is based upon specific assumptions. Variations in fuels, housing layouts, utility rates, and other factors would be confusing if exhaustively treated. Different conditions may be evaluated by comparing them with the assumptions on which this report is based. These assumptions are listed later in this report.

Weights of Critical Materials

A summary of the weights of materials required for a typical project of 500 houses using various utility schemes is shown in Tables 1 and 2. (A description of the housing project will be found on subsequent pages.) Table 1 lists ten combinations of cooking, water heating, and house heating methods in order of increasing amounts of the most critical materials. Table 2 lists the same plans in order of increasing total weights, including iron and steel in addition to the previously mentioned materials.

Analysis of Utility Schemes

In looking at the summary tables, it is important to bear in mind not only differences in weights resulting from various plans, but also how available the various materials may be. Thus, in spite of the fact that a plan using kerosene for cooking, water heating, and house heating will require the lowest total weight, such a plan will use more copper than other methods and will require as fuel, kerosene, which is, itself, critical in a very considerable portion of the United States.

All-Gas Plan Attractive

Plan 5, using all gas for cooking, water heating, and house heating, is one of the most attractive. It will require a low total weight of material and relatively little critical material. The limitation on Plan 5 may be the availability of adequate gas supplies to take care of the house heating load, but decisions on this point should not be made without thoroughly considering the economics of energy production and distribution involved. This same comment also applies to Plan 3, using gas for cooking and water heating and coal for house heating. It is believed that, in many instances, the greatly increased weights of coal to be handled by all coal schemes will over-balance the saving in weights of materials needed on the project itself for the gas-using utility schemes.

Where gas is available, on the other hand, the low weights of materials needed for the utility services for Plan 5 make it highly desirable. Furthermore, substantial stocks of gas appliances still exist, and arrangements have been made for the

TABLE 1—VARIOUS SCHEMES LISTED IN ORDER OF INCREASING TOTAL WEIGHTS OF CRITICAL MATERIALS OTHER THAN IRON AND STEEL

(Items marked * out of order)

Plan No.	Cooking	Water Heating	House Heating	Total Weight	Iron and Steel	Copper and Copper Alloys	Rubber	Other Critical Materials	Total of Critical Materials Other Than Iron and Steel
1	Kero	Coal	Coal	454,666	443,104	7,059	503	4,000	11,562
2	Coal	Coal	Coal	485,416	473,854	7,059	503	4,000	11,562
3	Gas	Gas	Coal	496,166	483,150	7,934	503	4,579	13,016
4	Gas	Coal	Coal	513,066	500,050	7,934	503	4,579	13,016
5	Gas	Gas	Gas	372,396	358,626	8,439	503	4,828	13,770
6	Kero	Kero	Kero	318,291	304,104	9,684	503	*4,000	14,187
7	Elec.	Coal	Coal	475,270	457,733	12,336	1,166	*4,035	17,537
8	Elec.	Elec.	Coal	498,898	480,233	13,429	*1,201	*4,035	18,665
9	Elec.	Elec.	Kero	373,523	354,733	13,554	*1,201	*4,035	18,790
10	Elec.	Kero	Kero	333,895	313,733	14,961	*1,166	*4,035	20,162

Note 1: Wherever kerosene is used in a utility scheme, it does not include weight of steel barrels loaned to user by the oil company to store kerosene. Such returnable barrels hold 52 gals. of kerosene and weigh 90 pounds each, thus adding 45,000 pounds of iron and steel to the total weight of material required.

TABLE 2—VARIOUS SCHEMES LISTED IN ORDER OF INCREASING TOTAL WEIGHTS

(Also in order of iron and steel, except where marked*)

Plan No.	Cooking	Water Heating	House Heating	Total Weight	Iron and Steel	Copper and Copper Alloys	Rubber	Other Critical Materials	Total of Critical Materials Other Than Iron and Steel
6	Kero	Kero	Kero	318,291	304,104	9,684	503	4,000	14,187
10	Elec.	Kero	Kero	333,895	313,733	14,961	1,166	4,035	20,162
5	Gas	Gas	Gas	372,396	*358,626	8,439	503	4,828	13,770
9	Elec.	Elec.	Kero	373,523	*354,733	13,554	1,201	4,035	18,790
1	Kero	Coal	Coal	454,666	443,104	7,059	503	4,000	11,562
7	Elec.	Coal	Coal	475,270	457,733	12,336	1,166	4,035	17,537
2	Coal	Coal	Coal	485,416	473,854	7,059	503	4,000	11,562
3	Gas	Gas	Coal	496,166	*483,150	7,934	503	4,579	13,016
8	Elec.	Elec.	Coal	498,898	*480,233	13,429	1,201	4,035	18,665
4	Gas	Coal	Coal	513,066	500,050	7,934	503	4,579	13,016

Note 2: Wherever coal is used in a utility scheme, it does not include weight of coal shovels, scuttles, and ash barrels.

Note 3: Electricity for lighting and small appliances is included in all Plans.

production of certain models under War Emergency Standards thus assuring the availability of safe and efficient equipment as new projects are started. These appliances are low in cost and are truly modern units for the home, maintaining the living standard in contrast with the relatively less desirable coal or kerosene equipment.

Electricity for cooking and, possibly, water heating was naturally considered, but the total weights of materials required as well as the weights of critical substances, like copper and rubber, are so increased by the use of electricity that such schemes are the least attractive of all plans considered. In addition, it was necessary to limit the electric distribution system design in order to conserve critical materials and under such circumstances relatively poor electric service must be expected. Sacrifices in speed and performance of electric appliances and in voltage delivered to the more distant customers are among the disadvantages of a practical nature to the electric schemes.

Figure 1—The use of kerosene for the range, the water heater, and the floor furnace results in the lowest total *weight of critical metals but requires the most critical of fuels. Plan 6 is rather high in its requirements of copper and its alloys. Labor barrels, and trucking add other disadvantages*

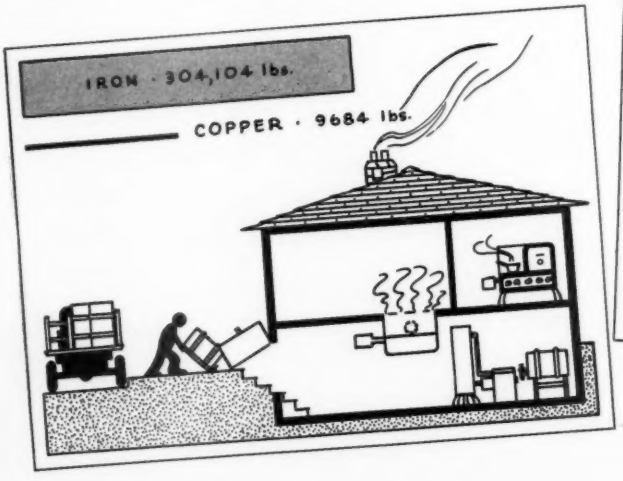
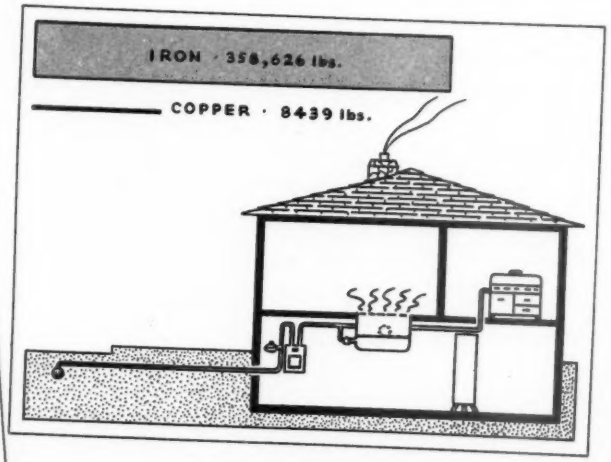


Figure 2—Undoubtedly the most desirable fuel from the user's viewpoint; scarcity of gas for space heating is the most serious drawback for Plan 5. This plan requires no labor, gasoline or rubber for truck distribution of fuels to the user. It is low in its use of critical metals. Gas is used for the range, the automatic water heater, and the floor furnace



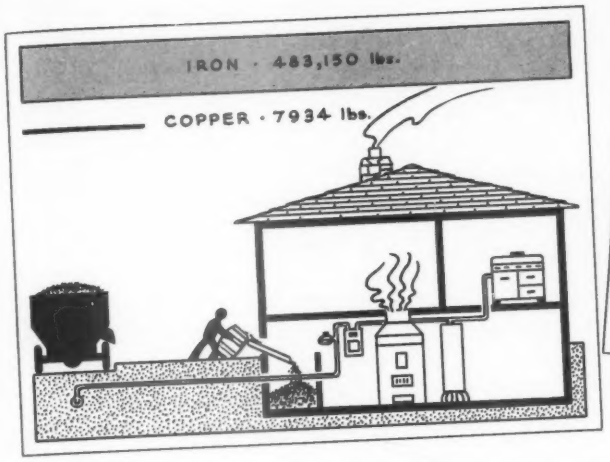


Figure 3—Most nearly approaching typical American homes in its choice of utility services, Plan 3 provides gas for the range and automatic water heater and coal for the pipeless furnace. This plan is far more convenient for tenants than Plan 2 which uses just a little less metal

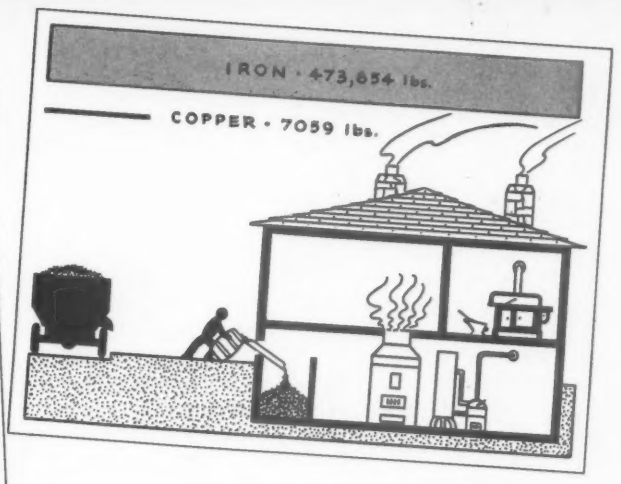


Figure 4—The old-fashioned way shown in Plan 2 uses coal for the kitchen range, the pot stove, and the pipeless furnace. Fine heat for the northern winter, its inconveniences, and drawbacks show up in the warm weather. Savings in metals over the superior Plan 3 are slight

Most Desirable Utility Schemes

The plans which deserve the greatest consideration are No. 2, No. 3, No. 5, and No. 6. These plans are advantageous either because they use minimum quantities of total material which is especially reflected in minimum quantities of iron and steel or else because they save substantial amounts of copper for modest additional increases in the weights of iron and steel. Table 3 shows the relation between the weights of iron and steel and the weights of copper required for these four plans. Plan 6 saves 43.9 pounds of iron and steel for each additional pound of copper it uses compared to Plan 5. However, Plan 6 requires the use of kerosene as fuel. Plan 5 saves 83.6 pounds of iron and steel for each additional pound of copper it uses as compared with Plan 2. Plan 3 requires small additional amounts of iron, steel, and copper as compared to Plan 2, but furnishes a much more modern and convenient service.

Use and Transport of Coal

The adoption of Plan 2 for a number of recent housing projects suggests the desirability of considering the over-all picture of weights of materials installed and weights of coal which must be transported. The all-gas Plan 5 would require a total of 3500 tons of coal delivered to the gas plant* while the all-coal Plan 2 would require 5545 tons per year delivered periodically in small lots to 500 homes. This greater quantity of fuel and the ashes resulting from its burning would add to the loads on coal mines, railroads and trucking facilities. Plan 3, typical of thousands of homes in manufactured gas territory using gas for cooking and water heating and coal for house heating, would require 3900 tons of coal per year, of which only 690 tons are required to produce the gas for cooking and water heating.

The poor showing made by plans using electricity because of the large amounts of critical materials used is further emphasized when the coal requirements are computed. Using most favorable coal consumption figures as obtained in highly efficient electric generating plants, it will require 2¼ times as much coal (1540 tons per year) to produce the amounts of electricity required for cooking and water heating as it will require to do the same jobs with gas.

Cost of Gas

The plans using gas as fuel will be found to compare favorably in operating cost with any of the other plans when manufactured gas is used. When natural gas is available its use will generally result in lower operating costs than any other fuel.

The low installed first cost of gas appliances adds to the desirability of plans using gas, particularly in comparison to the high cost of electric equipment. Furthermore, records of service costs available from Government housing projects show that gas equipment is inexpensive to maintain.

Gas appliances are superior in speed, performance, cleanliness, convenience and safety to those using any other fuel. The only plans which require smaller amounts of critical

TABLE 3—RELATION BETWEEN WEIGHTS OF VARIOUS MATERIALS

Plan No.	*Cooking*	*Water Heating*	*House Heating*	*Saving in Iron and Steel Over Next Plan*	*Added Use of Copper Over Next Plan*	*Pounds of Iron and Steel Saved per Added Lb. of Copper*
6	Kero.	Kero.	Kero.	54,522	1,245	43.9
5	Gas	Gas	Gas	115,228	1,380	83.6
2	Coal	Coal	Coal	9,296	875 Less	*
3	Gas	Gas	Coal	———	———	———

*PLAN 2 uses a small amount less iron and steel, and less copper than PLAN 3.

NOTE: Exclusive of weights of auxiliary equipment such as kerosene barrels, ash barrels, etc. If these were included, the gas plans would become relatively more favorable.

* No coal when natural gas is available.

materials than the plans using gas are those which employ inconvenient non-automatic fuels.

Selection of a Housing Project

The typical project selected for this study was assumed to have 500 homes of duplex construction. The project's outside dimensions are 1300 ft. x 1965 ft., and the project is laid out in rectangular streets for the sake of simplicity. The individual lots are 34.5 ft. x 100 ft. One service is provided for each two dwelling units. Gas service is at high pressure with an individual regulator for each service. The distribution design is based on the War Production Board demand factors and results in a most efficient layout in accordance with the Board's Utility Housing Standards. Two gas piping layouts were made, the one including house heating by gas together with cooking and water heating, and the second designed for cooking and water heating by gas. Electric layouts for the projects were also made so as to furnish information on the details of the electric system. These were carefully checked by electrical distribution departments of two large utility companies.

Gas and electricity were both assumed to be available in the street on one of the long sides of the project, although not present in the project streets themselves. Gas was assumed at 540 B.t.u. per cu.ft. (If natural gas were available, its higher heating value would permit reductions in the sizes of mains required.) An initial gas pressure of 31 pounds per square inch and a minimum regulator inlet pressure of 1 pound per square inch were used as the basis of design for the gas distribution system.

After due consideration, it was felt that no material allotment would be necessary for the building of new utility plant facilities to handle an additional load of 500 homes. In any case, the details of such considerations would be beyond the scope of this report and would apply to both gas and electric services.

Utility Layouts

Ten plans for the housing utility services were considered using various fuels as shown in Tables 1 and 2.

In each of these plans, ice for refrigeration has been indicated because this uses the least critical materials. Oil central heating systems have been omitted because of the obvious increase in weight required by the oil storage tanks and the piping and pumping equipment, without any compensating gain. Since there are satisfactory kerosene-fired floor furnaces, consideration has been given to their use, at least in areas where oil supplies are adequate.

This study gives consideration to the weights of rubber, copper, other critical materials, and iron and steel. Under the term "other critical materials," there have been included the amounts of aluminum, antimony, cadmium, chromium, nickel, tin, zinc, fuse metal, solder, thermostatic metal, white metal, leather and shellac.

Construction Standards

The construction standards followed in this study conform to the Utility Housing Standards of the War Production Board and, as a result, lead to the use of minimum weights of critical materials. The War Production Board deserves credit for the release of critical materials for more direct use in the war effort by means of the War Emergency Utility Housing Standards. The savings not only reduce the use of vital metals and rubber, but the construction requirements minimize the man hours of labor required. These steps, in turn, keep down the cost of the homes and thereby make low rents possible.

A modern Victory gas range. Equal in capacity and speed to pre-war ranges, this typical war model gas range uses only 16 pounds of cast iron and 63 pounds of steel. A small amount of brass is furnished in the gas valves as long as stocks are available. Note that this range weight is substantially less than the unit weights included in this study. For a 500 house project, this model range would save 10,000 pounds of metal over the type used in the tables in the report

One of the developments of the United States housing program has been the insistence on gas appliances which shall have the highest possible standards of efficiency and yet be compact and low in cost. In a sense, such appliances offer de luxe service without stepping out of character with the furnishings and fittings of the rest of low-cost homes. In the ranges built to the American Emergency Standard Requirements, most of these features have been retained in spite of the drastic reduction in weight. For example, the gas range will require 99.75 pounds of iron and steel and 0.25 pounds of copper and copper alloys. No other critical materials are needed. *In spite of this reduction in weight, such a gas range has the standard capacity of top burner cookery and standard capacities and speeds for both broiling and baking.*

Electric Stove Comparison

A comparison in this study is made with a war-time electric stove although it is recognized that such electric stoves are not standard either in regard to capacity or speed of cooking. In order to achieve the light weights required for an Emergency War-Time electric stove, it has been necessary to eliminate 25% of the top burner electric stove capacity and to use the open coil type of element which is subject to high maintenance and considerable loss of efficiency with continued use. The decrease in the capacity of the electric ranges can be judged by comparing their 6300 watt input with the average input of 9450 watts shown in the specifications of current household

electric range models 25 in. wide or less published March 4, 1942 in "Air Conditioning and Refrigeration News."

Because of the possibility of effecting savings in copper, this study was referred to a number of independent electrical engineers whose responses left no doubt that the sizes of transformers and conductors set up for comparison in the ten plans were already at an absolute minimum. Any further attempts to reduce sizes would fall below minimum standards demanded by the Housing Authorities and would introduce serious hazards.

Water Heater Study

In the case of water heaters, a number of manufacturers make both gas and electric models, and a suitable comparison was readily set up. However, it is essential to recognize the difference in capacity between gas and electric water heaters. For example, the 30 gallon tank electric water heaters with 1,000 watt elements made by one manufacturer have a weight of 332 pounds. These heaters are rated at a recovery of 5 gallons per hour which means that the maximum output of any one hour is represented by the 30 gallons of water in storage plus the 5 gallons recovery (actual delivery is less because of certain losses). The same manufacturer suggests his gas water heater with a 20 gallon tank and 20,000 B.t.u. gas input having a weight of 211 pounds. Such a gas water heater has a rated recovery of 16 gallons per hour which, added to the 20 in storage, furnishes 36 gallons as the maximum output in any one hour. The comparison between these two heaters must also be viewed from the conditions when all of the hot water has been used up. Under these circumstances, the gas water heater will continue to deliver three times as much hot water per hour, i.e., 16 gallons compared to 5 gallons. This advantage of the gas water heater is coupled with the fact that it only takes 65% of the weight of material needed for the electric heater.

The gas water heater type chosen for these studies was an automatic circulating tank heater attached to a 30-gallon galvanized storage tank. This combination weighs 115 lbs. A smaller storage tank could be used without causing difficulty for most families.

The heating equipment is another highly important factor, and to make the problem specific, it is assumed that the house will have 4½ rooms and a heat loss of 50,000 B.t.u. per hour. Except in the extreme north of the country, such a house could readily be heated with one floor furnace having an input of 75,000 B.t.u. per hour. Such a unit will have a weight of 325 pounds of iron and steel and approximately 4 ounces of copper. The most appropriate comparable coal unit would be a pipeless furnace, and a unit having only 61,000 B.t.u. per hour input, which was the nearest available size, will weigh about 616 pounds, all iron and steel. Of course, this coal furnace would not have the recovery capacity which the gas furnace can offer, and no consideration has been given to the relative comfort and convenience of gas as compared to coal firing, not to mention additional savings in the construction of the house, made possible by the use of the gas floor furnace.

High Pressure Distribution

The interesting part of the gas distribution system comparisons is that the use of high pressure gas makes it possible to adopt minimum sizes of pipe without any loss of capacity and necessary pressures at the delivery ends. When anything along these lines was attempted on the electric distribution facilites, there was an immediate problem due to lack of voltage at the delivery points. This lack of voltage would make itself felt in dimming and flickering of lamps as appliances were turned on or off and in loss of speed in cooking as well as danger from burning out of motor-driven appliances.

The war worker's home conditions have an important influence on his ability to produce war goods. Delay in cooking, poor light, and dissatisfaction with equipment due to maintenance troubles are not conducive to promotion of maximum welfare among such workers. It is fortunate that gas service is so generally available, making it possible to continue normal, healthful home life without being subject to limitations and annoyance.

Due consideration has been given to systems using kerosene ranges, kerosene water heaters, and kerosene floor furnaces. It is recognized that these units are, in some ways below the standards desired for war workers' homes, but not substantially so, and therefore, in areas where kerosene is available, the use of such utility schemes might be highly desirable. It is fortunately true that where kerosene is most plentiful, the climate is also such that the kerosene floor furnace is a practical system.

The availability of light-weight coal ranges, approximately 125 pounds each, makes them attractive from the point of view of saving weight of materials for cooking. As will be seen from Plan 2, the total amount of critical materials, other than iron and steel, required by the all-coal system is lowest, but the amount of iron and steel is relatively high on account of the weights required for coal water heating and house heating equipment.

Cost of Utility Services

In this study, consideration has been given to the cost of operation by means of the various plans. Naturally, there is a great variation in the prices for fuels and rates for utility services in each community. There is, however, a convenient yardstick at hand in the form of the Federal Power Commission reports on the cost of utility services for most United States cities.

In certain manufactured gas areas, the cost of heating with gas is somewhat higher than the cost of heating with coal, and this economic factor will have to be considered in relation to the weights of materials involved. The total cost, however, of heating a small house by gas is, itself, low, and therefore, the difference between the cost of gas and coal, even in the higher-priced areas, may be well within the worker's ability to pay, especially in light of the convenience of automatic heat.

In a very large part of the United States, natural gas is available at costs

(Continued on page 123)

Job Training . . . *An Educational Program to Improve Gas Appliance Servicing*

By KENNETH WOOD and CHARLES F. TURNER*

The East Ohio Gas Company, Cleveland, Ohio

Kenneth Wood

THE extent to which "the American way" of doing things has taken hold of the appliance-building and utilization part of the gas industry during the past couple of decades has been phenomenal and accounts in large measure for the growth which the industry has made during that time. It is characteristic of the American way to do things automatically, and robots in the gas industry have played their part in the widespread public acceptance which gas enjoys.

Robot Service and Safeguards

We now consider as commonplace those devices used to turn on the heat in our homes and regulate their temperature when the weather gets uncomfortably cool; to cool and regulate the humidity of the air in our homes when the weather gets uncomfortably warm; to provide us with an adequate supply of water heated to our individual liking; to regulate the housewife's oven temperature to fit her particular baking specifications; to see that no gas is wasted if perchance the igniting pilot becomes extinguished; et cetera, et cetera.

Many of these control devices are mechanical in their action, many depend on electrical energy, all require intelligent understanding of their construction and underlying principles of operation if they are to function as their manufacturer intended them to function. A good example of this is the thermo-couple type of safety pilot, the underlying principle of which has been so universally misunderstood by service men.

It becomes at once apparent that if the gas appliances purchased in recent years by our customers are to give the kind of performance for which they were designed and of which they are capable, they must be given intelligent handling by trained servicemen when service is needed. It is the problem of how most effectively to promote that intelligent handling, to train the new man, to untrain and retrain many of the older men in our Service Departments, to keep abreast of developments, to impart the "know-how" to all the men in the Service Departments of our organizations—this is the problem, limited primarily to domestic gas appliance servicing, which we propose to discuss here.

"For the Duration"

"Appliance Servicing" is a subject which for many years has attracted the interest of the gas man. For a number of years the Distribution Committee of the American Gas Association has given it a prominent place on its Spring Conference programs and the lively discussions engendered there have always been indicative of the keen interest in this phase of the gas business. The present emergency, making it well nigh impossible for our customer to replace his obsolete, worn out or inefficient gas appliance with a modern one, gives particular point at this time to any measures which have as their objective the furtherance of programs designed to prolong "for the duration" the usefulness and satisfactory operation of gas-fired equipment. The authors of this article use that as their only excuse for presenting an outline of the educational program which their company has been carrying on for the past three years. As events have turned out, the several educational activities carried out under this program have proven very timely and tie-in well with the Fuel Conservation Program of our government.

Charles F. Turner

It should be understood at the outset that the merchandising policy of The East Ohio Gas Co. has long been one of dealer cooperation, the company doing little or no selling or installing of appliances but helping the dealer to sell proven appliances and promote new ones. Some of the educational activities were incorporated to help in the cooperative plan. Like many other gas companies, we have for years back carried on systematic programs of employee education but for the most part they were of the lecture and demonstration type and

Installing safey pilot on warm air furnace—a part of the house heating school training program

* Mr. Turner is vice-chairman of the Technical Section of the American Gas Association.

Learning fundamentals of gas combustion during house heating course. At right is shown a typical group in the range and water heater school

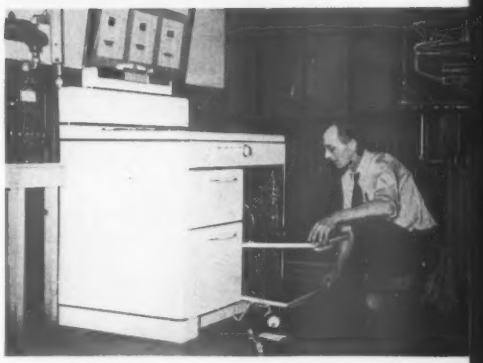
at times sporadic. Various departmental activities of the company were explained by department heads; manufacturers' representatives demonstrated their product; discussions on "Qualities of Foremanship" were conducted by outside talent. All of these methods of imparting knowledge were commendable and of considerable value in rounding out the scope of the employee's general knowledge of the gas business but such methods lack the one thing which service men need if they are to cope successfully with problems of mechanics, physics and electricity met with in their everyday routine. That thing is specific, hand to hand contact with and training in the construction and adjustment of the gas appliances and appurtenances with which they deal every day. They need Job Training, the chance to learn with their own hands, their own eyes and their own ears how each and every gas appliance is put together, what it is supposed to do, what its limitations are and what to look for when it ceases to perform as intended.

Experience showed us that the sort of training we have described and which we prefer to label "lecture type training," can and does serve as a useful corollary to an effective Employee Training Program but that it should not be adopted as the program itself. Nevertheless, it often is adopted as such because it follows the path of least resistance and because it offers a quick coverage of the service personnel, but in a very superficial way. Employee training can be effective only if it attains certain objectives; it must seek to know and find a practical solution for each employee's immediate everyday problems; it must show a sincere desire to help the employee by example and constructive argument rather than by sarcastic criticism and ridicule; it must show clearly and simply the direct relationship between the subject being taught and the practical application of that knowledge to the employee's daily problems; last, but by no means least, the instructor must possess those qualities which will gain and hold for him the confidence and respect of the personnel making up his classes.

Flexibility Essential

Training methods should not attempt to standardize along set and stereotyped patterns; they should remain flexible to meet changing conditions and provide proper allowances for great differences in the educational backrgound of individuals as they come and go. They should provide primary training for the new man and "brush-up" or "refresher" courses for the man with experience.

The apprentice system is probably one of the most widely used methods of training the new man but, despite the fact that it has many desirable features and is a useful part of a training program, it has certain serious disadvantages which can lead to trouble if it constitutes the sole method of training. Under the apprentice system the trainee obtains much of his information and most of his field training from the older or more experienced employee with whom he is paired. Often the information or the working habits of this older man are wrong or inefficient with the result that there are two misinformed and inefficient employees.



Calibrating oven regulator on modern gas range during range and water heater course

Then, too, sometimes it happens that the older man is unable or unwilling to impart his knowledge to his helper; often he is impatient or resentful and interested only in getting manual labor out of the man.

The foregoing observations are offered as a preface to a description of the program itself. They also serve as an explanation of our reasons for reorganizing our training methods along lines which we felt ought to result in more intelligent handling of our customers' service requests and reduced costs to the company. This reorganization was put into effect three years ago and the results to date have been highly satisfactory on both counts. Happily, the new plan was well under way when we entered the war and we were able almost at once to cooperate in the national program to conserve mileage and assist in maintaining present domestic gas equipment in the best operating condition possible.

The training program was built around two basic courses; (1) House heating and (2) Ranges and water heaters. Because of the large house

heating load, the course in that was the first set up. Later the one on ranges and water heaters was patterned along the same lines. Instruction in the Gas Refrigerator was added to this course.

All training is done on company time; no employee is asked to attend evening classes. Groups are kept small—not over six, more often four—and they spend a continuous 40-hour work week in the class room. The personnel of the weekly groups was drawn from the company's shops or service centers throughout the system. Out-of-town men were quartered near the school and their expenses paid.

The first third of the week is devoted to a study of fundamental principles and basic facts which every service man should thoroughly understand but often does not. The next third is devoted to a hand-to-hand drill in the construction and adjustment of appliances and appurtenances, in analyzing trouble causes and making the necessary adjustments and repairs. The "cut and try" method of trouble-shooting is discouraged and substituted for it is a systematic point by point check. Each man is taught to study first the symptoms of a trouble case, then to reason from the symptom to the cause. This procedure gives him confidence, reduces callbacks and tends greatly to bolster public confidence and public relations.

Small Groups Preferable

Individual instruction can only be fruitful when the groups are small enough to enable the instructor to study each man's experience, education, peculiarities and capabilities. Experience has proven the great value of the small group and individual coaching. The remaining third of the time is spent in pointing out the importance of accurate, concise, yet adequate, reports covering all the essential information, in reviewing the work covered (by written quiz and round-table discussions) and in dealing with special problems.

The equipment used in the schools is company owned except for an occasional demonstration panel or control describing something not commonly met in the field. No attempt is made to provide a great variety of appliances or accessories. Rather, they were selected because they predominated in the field, demonstrated certain operating principles, represented a price range or because they were particularly complicated or troublesome. Before restrictions on appliance manufacture and sale were imposed, arrangements were worked out whereby school appliances might be exchanged for later models if desired, the company standing any additional costs the dealer might incur in disposing of the school appliance.

So much for the general pattern of the basic courses. Any pattern cannot be considered complete or entirely satisfactory which does not allow for special training, more extensive training in certain directions or of certain individuals, or if it does not provide for refresher courses. While we do not employ "specialists" on service work, there are some men who get more of one kind of work than others. From time to time new equipment in the field, new service policies or special cases are brought to the attention of the men in shop-by-shop meetings usually held an hour before quitting time.

A. G. A. Manuals Used

As a complement of the class room instruction, special bulletin boards, reserved for service school information only, were mounted in each shop. Each is provided with a shelf and pigeon-holes in which A. G. A. manuals on range and water heater servicing are kept. Each manual is permanently fastened to the board by a length of light chain. On the backboard are pasted information bulletins, diagrams, cuts, special adjustment instructions, etc.

One of the greatest benefits derived from the Service School has been the correlating of departmental problems and the unifying of concept and treatment of service work on appliances. Every Home Service girl attends the Range and Water Heater School. She must work on the appliances making adjustments, analyzing service calls, learning their proper uses, capabilities, limitations and abuses just as the shop service man must do. Although these girls make only top burner and oven regulator adjustments on ranges, they are familiar with the range's make-up and performance and are able to talk with confidence when asked her opinion during calls or demonstrations. Such training also makes them less critical of the service man's work.

The counter people are given limited training in appliance adjustment but they, too, are better able to handle their own routine because of their first-hand contacts with the other departments. Extension of the training work is carried by lecture and demonstration to the telephone girls who receive incoming calls from customers. They handle inquiries more intelligently, more expeditiously and more confidently as the result.

A complete and effective training program may be set up within a company and yet leave much to be desired. If the advice and counsel of the utility employees are frequently countered by conflicting misinformation by outside dealer organizations, the customer becomes the victim, the utility may suffer and the dealer blithely pursues his way to the next prospect convinced that the gas man is a bungler and an obstacle in his path. The remedy is apparent; gain the confidence and cooperation of the dealer and his organization by extending to them the facilities of the Service School and instructor and help him to train his service men in the proper understanding of gas combustion and gas equipment. Toward this end we have on occasions held demonstrations of appliance adjustment for our dealers' men, for plumber organizations and for individuals making their living in the sale and servicing of gas heating equipment. The reaction has been one of gratitude and the result has been a confidence in and familiarity with the concepts of good practice in appliance design, construction, installation and performance. Not the least of the benefits has been a far greater realization of the meaning

(Continued on page 123)

CONSERVATION ADVERTISING

More samples of current gas company newspaper advertisements which tie in with the WPB gas-saving program. Other pages of advertising have appeared in recent issues of the A. G. A. MONTHLY.

THERE'S A WEAPON ON YOUR WALL...

that can help beat the Axis. It's your Thermostat . . . Standing guard against waste . . . Conserving gas that is vitally needed to build Ships, Planes, Tanks, and Guns.

See that it's set for Wartime Economy!

You don't need to be in the armed forces to help win this war. Right here, on the home front, you can do your part by carefully conserving the things needed most in the war effort.

Take your use of gas for example. You have always been accustomed to ample quantities for heating, cooking, and other domestic needs. But now gas has been called upon for extra duties—to help build the ships, planes, tanks, guns, and other war material so urgently needed at the battle fronts. Right here in the St. Louis area, we are supplying millions of cubic feet of gas daily to war industry—in addition to supplying normal home demands.

To release more gas *for industrial use*, your government asks you—not to do without—but to use gas wisely, without waste. If you heat with gas, keep your wall-thermostat set at 65 degrees during the day, lower at night. What you save in this way in your home, added to the gas saved in thousands of other homes, may keep an extra shift employed in a war plant. Save in cooking, as water-heating, in every way you employ gas in your daily tasks. You'll be doing your part to help shorten the war.

Remember, wartime has put extra strain on all facilities for supplying gas. Steel and other critical materials necessary for expansion are not available for the needed additions to natural gas pipe lines or for building new manufactured gas plants. But gas can continue to serve you efficiently and well—provided you use it wisely—and share the supply with war industry.

HERE ARE 17 WAYS YOU CAN SAVE GAS!

1. IMPORTANT! Do Not use your gas range for heating the kitchen. Gas used for this purpose cannot make boiling, frizzling, and smoke.

COOKING

2. Heating water for cooking purposes, but only enough needed.
3. When preheating oven or broiler, preheat for necessary length of time only.
4. Use low temperatures for most roasting. This also lowers meat shrinkage.
5. Use small size burners for cooking average quantities of food. (Use more or fewer burners, or the flame.)

WATER HEATING

6. Do not let water run while washing face or hands, shaving, washing dishes, etc. Use plugs and stoppers.
7. Do not replace or repair leaky faucets.
8. Do not fill tub too full when taking baths—4 inches of water is usually sufficient. When using shower, get in and get out quickly.

REFRIGERATION

9. Don't crowd refrigerator. If it is not full a uniform cold (no circulation of air and requires efficiency).
10. Open doors as infrequently as possible. Close doors quickly.

HOUSE HEATING

11. Set thermostat at 65 degrees during the day, and lower at night.
12. Shut off and do not heat parts of home not in use. (Plumbing which might freeze should be protected.)
13. Use fireplace for auxiliary heating. When not in use, close fireplace damper.
14. If you sleep with your bedroom windows open, shut off heat and close door. If you have a warm air system, close both warm and cold air registers in bedroom.
15. Clean or replace, when necessary, the filters used in your warm air furnace.
16. Don't obstruct the circulation of air over radiators or registers or their efficiency will be impaired.
17. Regardless of what fuel you may use to heat your home there are certain steps which can be taken to reduce your fuel requirements. The installation of insulation, storm sashes or weather stripping will effect a substantial saving and provide additional comfort. These items are deductible in any state and should be considered only as war time economy measures.

The foregoing suggestions are made by the War Production Board, whose position has been stated authentically as follows . . . *every effort must be made by the consumer, in concert, if mandatory curtailment of gas is to be avoided. The cooperation of the consumer and the Gas Industry is essential . . . failure may make a mandatory program of gas curtailment necessary.*

Laclede Gas COMPANY

OLIVE AT ELEVENTH — CENTRAL 3800

UNITED STATES MERCHANT MARINE ... determined to see "Our unsung heroes." Getting materials to all fronts is their part in this war. And how they are doing that! Through submarine-infested waters, around the perilous North Cape route to Murmansk, across the hazardous Pacific . . . to all our distant fronts the Merchant Marine is "doing its stuff." Valorous will be written about the courage, resourcefulness and determination of these Navy-trained men who are delivering the goods to our armies and to our allies. Their place in history alongside our armed forces which are bringing the Victory home.

Wise Use Of Gas Is Our Way Of "Doing Our Stuff"

Even by using gas wisely, you are contributing to Victory. In these days of fuel oil shortage, you can help by planned use of your gas service. Oil, as well as coal, is used to manufacture gas for home and industrial use. Until the present emergency has been lightened your co-operation is asked by the War Production Board. Think of the sacrifices of our boys in the Army, Navy and Marine Corps . . . then let your consumption be your contribution.

Fitchburg Gas and Electric Light Co.

A MESSAGE OF VITAL IMPORTANCE TO ALL USERS OF CITY GAS

THE oil delivery situation in the eastern part of the country, particularly in New England is critical. Further, it appears to be growing more alarming as each day passes. The time is here to inform you in a most emphatic way how grave the situation really is and to appeal to you to help in every way you possibly can to remedy conditions.

Oil is a vital fuel used in the manufacture of City Gas. Hundreds of thousands of people in New England depend on Gas for cooking and water heating. The present oil delivery situation threatens to drastically curtail the making of Gas and if this threat becomes a reality, untold hardships and suffering will confront a great number of families who have no other means available for the preparation of hot meals and the heating of water.

There is something that you and all other users of City Gas can do NOW to postpone, if not entirely eliminate, drastic curtailment in the production of Gas. If all Gas users—every one of them—will put into practice at once the economical measures enumerated below, it will be of great help in stretching the available supplies of oil over the present crisis.

Nothing less than wholehearted cooperation by all users will accomplish sufficient results to prevent the possible suffering that will result if large scale mandatory curtailment becomes necessary.

Our customers can rest assured that we will do everything humanly possible to keep Gas available to them. Our plant facilities are operating under the most rigid form of economy and we now appeal to you to help us to the end all the others who depend so much on City Gas in the operation of their homes.

HOW YOU CAN HELP

1. Do not use gas range score or top burners to heat kitchen.
2. Use gas for baking or broiling as little as possible.
3. If using oven, plan to cook entire meal at one time.
4. When cooking vegetables, use little water. Turn down gas flame when boiling starts.
5. Use as little hot water as possible for every household purpose.
6. Don't let hot water run when shaving, washing hands, washing dishes.
7. Have leaky hot water faucets repaired now. Leaky faucets waste fuel and money.
8. If your home is heated with a gas furnace set thermostat at 65° or lower.
9. If you have a kitchen-heating gas range set thermostat at 65° or lower.
10. Set thermostats lower at night.
11. Reduce the use of gas [illegible]

CONNECTICUT LIGHT & POWER

WARNING TO ALL GAS USERS

Oil shortage threatens GAS supplies to war industries

Homes asked to make drastic cuts in use of GAS for Cooking, Water Heating, House Heating, Refrigeration

The cold spell has aggravated the shortage of fuel oil needed to make Gas to the point where drastic measures are necessary to avoid shutting off war industries and food producing plants.

For the next few days, until oil supplies are replenished, it is urgent that you save Gas in the following ways:

1...IF YOU COOK WITH GAS

...Use oven as little as possible, preferably not at all.
...Use one top burner, and then only for essential purpose.
...NEVER UNDER ANY CONDITION USE RANGE OR OVEN BURNERS FOR HEATING KITCHEN!

2...IF YOU HEAT WITH GAS

...Limit use of hot water to least amounts.
...Avoid taking hot baths for the next few days.
...Wash entire day's dishes at one time.

3...IF YOU USE GAS FOR HEATING HOUSE

...Close off all rooms not absolutely needed.
...Keep windows closed until emergency is over.
...Use your fireplace and electric heaters as much as possible.
...Keep thermostat below 65 degrees.

YOUR GOVERNMENT ASKS YOU TO COOPERATE WITH YOUR GAS COMPANY IN USING LESS GAS!

Your Government Warns Public of Fuel Shortage

GAS Is a Precious Fuel Guard Its Use Carefully

We know our customers use gas economically because the average domestic bill (without house heating) is only $2.16 a month (1600 cubic feet).

But now the Government needs your help to use all fuel *SPARINGLY*, including gas.

All consumers and *especially* those now using more than 1600 cubic feet a month are asked to cut down gas consumption.

THIS IS A WAR SERVICE

We know you will understand and cooperate with our effort to comply with our Country's needs.

Avoid gas fuel rationing by using gas with greatest economy

7 WAYS TO SAVE GAS

1. Keep all appliances clean and in good working order.
2. Use your gas range for cooking only—not to heat kitchen.
3. Cook only enough food to use [illegible] heating them later.
4. Use [illegible] cooking.
5. Use [illegible] cook in water [illegible] cooking.
6. Reduce house temperature and wear warmer clothes.
7. Especially when temperature drops to 32° or below [illegible] you would wear more clothing to keep warm, so as to reduce the use of gas for heating.

Remember always, someone's life may depend on the materials you save for the war effort. Don't Waste Gas!

BROOKLYN BOROUGH GAS COMPANY
CONEY ISLAND, N. Y.

How to

Save Money
Save Heat
Save Fuel

The saving of Natural Gas fuel is very important today. War industries going full blast are using an increasing amount of this fuel. It takes a huge amount of Natural Gas to heat homes, to cook meals and to heat water. There will be enough for all if each user will save fuel by eliminating heat waste.

Here are Ten Heat-Saving Suggestions:

1. **Check Heat Leaks at Windows.** If there is a stream of cold air leaking through or around a window, plug that leak. A temporary weather stripping insert folded wrapping paper or newspaper between the window sash and window frame.
2. **Close Bedroom Door at Night.** If you open bedroom windows at night keep the bedroom door closed. Place a rug against the bottom of the door. There is no need to chill the rest of the house during sleeping hours.
3. **Close Fireplace Damper.** If you have furnace and fireplace, close damper when fireplace is not in use. Your furnace heat is sucked up a chimney that is provided for a gentle draft.
4. **Close Garage Doors Under Steam.** If your garage is under the house keep garage doors closed. Open garages, even in cold air and chill floors unnecessarily.
5. **Overheating your House is NOT Healthful.** Every degree of heat in your house over 65 degrees uses up from 5% to 6% more fuel. Keep comfortable, but do not overheat your rooms.
6. **Do Not Use your Range as a Heater.** Using a range oven as a heater is inefficient and shortens the range's life. Use your range for its one important job—cooking. Remember that these days a range may be hard to replace.
7. **When the Sun Comes Out—Turn out your Heater.** It is a good rule to keep lower heating temps. 1 or no heat when the days where you are active about the house. 1 or no heat when the sun shines and outside temperature is 45 degrees.
8. **Shut Off Unused Rooms.** Turn off the heat in unused rooms and close the doors and you will have more heat for the other rooms.
9. **Open and Close Outside Doors Promptly.** A lot of cold air readers in when outside doors are opened. Warn the children particularly about this. Do not stand and talk in an open door.
10. **Keep Window Locks Fastened Tightly.** Window catches, especially on French windows, rarely loose. Fasten these catches down fast! This forces the sash against the window frame and checks incoming draft.

P·G·and E·
PACIFIC GAS AND ELECTRIC COMPANY

REMEMBER NATURAL GAS IS A WAR MATERIAL - USE IT WISELY

URGENT!

Use Less Gas for Cooking, Water Heating House Heating

Residential gas users are requested by the Government to reduce the amount of gas consumed in their homes.

The necessity for this action is due entirely to the critical shortages of oil in the Atlantic Seaboard States brought about by wartime conditions.

To make the gas used in Baltimore this winter requires over 1,000,000 gallons of oil per week.

The War Production Board has warned Eastern gas companies of the grave possibility that full oil requirements cannot be supplied in 1943.

Government authorities therefore urge full and immediate cooperation by ALL CUSTOMERS in curtailing the use of gas to conserve oil for military needs.

VOLUNTARY ACTION TODAY MAY AVOID ENFORCED RATIONING LATER.

You can do your part by following these Government instructions:

DON'T USE YOUR GAS RANGE FOR HEATING THE KITCHEN OR HOUSE

HOUSE HEATING

If you heat your home with gas, keep it at 68°, and lower at night.

Do not overheat by fireplace if you have one. Close fireplace damper when fire is out, to prevent heat from going up the chimney.

Don't use auxiliary gas burners if your home heating plant is damaged or oil fired.

Put weather stripping around doors and windows. Install storm windows and doors.

Close off rooms you don't need. Keep bedroom doors closed at night and turn off radiators.

COOKING

Cook with a blue flame (not yellow), and use least water to do the job.

Plan your meals so as little gas as possible. When you do plan to cook with burners lit is.

Don't open oven door often.

Plan more "one-dish" meals. Cook more than one thing in a pot, if possible.

WATER HEATING

Never turn on a hot water heater unless hot water is needed.

Keep leaky hot water heaters repaired.

Don't let hot water run while washing hands, shaving or washing dishes.

Don't let hot water run needlessly. Use as little hot water as possible. Use as little as you can get your work done with.

Get and set regularly at the manufacturer.

THE GAS AND ELECTRIC COMPANY
LEXINGTON BUILDING — BALTIMORE, MARYLAND

SAVE GAS TO GUARD A SOLDIER'S LIFE

Gas is vital to making the weapons that win victory. It's the Nation's number one war fuel. It's the fuel that gives the steel the strength and endurance required, and the fuel that helps keep the workers on the job. Gas, of course, is also a fuel of peace. It's the fuel that you know so well in cooking and with gas in your own kitchen.

Today, gas is needed in huge quantities for war industries, as Greater Boston knows. This company now supplies the enormous demand.

Gas and oil required in the manufacture of gas must be conserved, now more than ever. Gas companies will not be able to meet the increased demand, even with the use of oil. We believe that you know as well as we do that every gas right at your command is necessary.

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Gas and oil required in the manufacture of gas must be conserved, now more than ever. Gas companies will not be able to meet the increased demand, even with the use of oil. We believe that you know as well as we do that every gas right at your command is necessary.

HERE'S HOW YOU CAN SAVE GAS NOW:

1. Do not use gas unnecessarily, even on top burners for heating your kitchen.
2. Economize in cooking by having more one-dish meals, by using refrigerator, by cooking less water when cooking vegetables.
3. Reduce use of hot water. Repair leaking faucets. Take fewer baths.
4. If you have gas heating equipment, set thermostats at 65° when you are away, and at night. Prevent heat waste by completely closing off unused rooms.

We intend most diligently to conserve gas ourselves and to encourage conservation by our customers, and we appeal to you to help us in every way you can to save gas. We stand most diligently at customers' sides — in answer to our earlier appeals — in saving the gas we have during these critical days.

Boston Consolidated GAS Company

GAS
A VITAL WAR FUEL

IT MUST BE CONSERVED

THE WAR PRODUCTION BOARD of the United States Government has requested this company to save all its GAS customers to conserve GAS FUEL. It is an important war fuel. It is necessary that every means be taken to CONSERVE GAS in all its domestic uses.

Gas for cooking, refrigeration, water heating and house heating is made in part from OIL—a fuel which must be conserved because of the critical shortages in that fuel.

Therefore—your Government asks you to cooperate in every way you possibly can.

HERE ARE EFFECTIVE WAYS TO Conserve Gas IN YOUR HOME

COOKING

1. Use your gas range for cooking whenever the heat from the ovens, TRY TO COOK ENTIRE MEAL AT ONE TIME.
2. Use burners as little as possible. Use 25% LESS GAS than you are using now. Turn gas off as soon as cooking is finished.

REFRIGERATION

3. Don't open refrigerator frequently or leave it open. Get out of the kitchen, but not [illegible] before closing refrigerator.

WATER HEATING

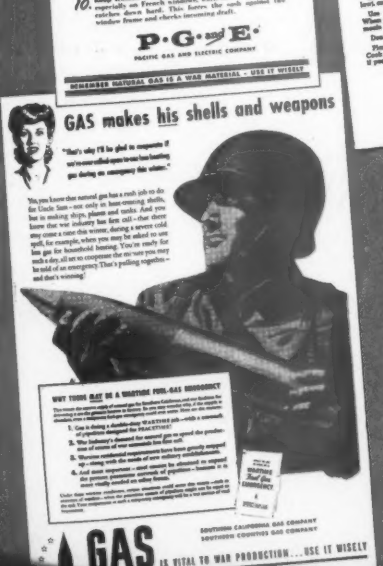
4. Don't waste hot water. Never leave on a hot water faucet unless water is really needed. Repair any leaky hot water faucets. TRY TO USE 20% LESS HOT WATER.

HOUSE HEATING

5. If you have your home with gas—watch that thermostat! Keep the setting no higher than 65 degrees, and lower at night. Don't use gas for auxiliary heating.

THE TAMPA GAS CO.

GAS makes his shells and weapons



"That's why I'll be glad to cooperate if we cannot collect gas to use for heating gas during an emergency like winter."

Yes, you know that natural gas has a rush job to do for Uncle Sam—not only in heat-treating shells, but in making ships, planes and tanks. And you know that war industry has first call—but there may come a time this winter, during a severe cold spell, for example, when you may be asked to use less gas for household heating. You're ready for such a day, all set to cooperate the minute you may be told of an emergency. That's pulling together—and that's winning!

WHY THOSE GAS OR A THOUSAND FOES-GAS BOOKLET

1. Gas is doing a double-duty WASTING job—still a necessity for [illegible]
2. Why [illegible] demand for natural gas to speed the production of [illegible]
3. Thermostat-controlled temperatures have been partially stopped up—using only the needed amount of [illegible]
4. And most important—fuel cannot be eliminated in [illegible]

GAS IS VITAL TO WAR PRODUCTION... USE IT WISELY

SOUTHERN CALIFORNIA GAS COMPANY
SOUTHERN COUNTIES GAS COMPANY

Gas Has Gone To War, Too!

Here's How You Can Help

1. Keep the water heater clean and [illegible]
2. Use [illegible] for cooking.
3. Avoid burning your kitchen [illegible] heating.
4. Avoid burning your kitchen [illegible] heating.
5. Use [illegible] for cooking.
6. Use [illegible] for cooking.
7. Use [illegible] for cooking.

BUY WAR BONDS AND STAMPS

Light & Traction Co.

NATURAL GAS IS VITAL FOR VICTORY

FREE BOOKLET..

Drop in or phone for a free copy of our booklet, "Keep Ice Working and Conserve Gas."

Plan Now How You Can Conserve It In YOUR Home!

If during cold spells this winter, the gas demand in a locality should exceed the supply, we will call upon you to help conserve gas. Everyone is to have gas, therefore every customer must do his part when we call upon you. Here's what you can study so you will know exactly what to do when we do call upon you:

1. Shut off parts of the house not in use.
2. Do not keep your rooms too warm. Turn thermostats to [illegible] temperature.
3. Refrain from using the range even for [illegible] heating.
4. If requires a lot of heat to warm up an [illegible] and rooms in the morning. It is [illegible] to keep the house [illegible] temperature partially warm all night.
5. Keep your heating equipment in top-notch [illegible].
6. Install insulation, storm sash, weather stripping if you have not already done so.
7. Economize in use of the range by using a low blue flame, cutting down on [illegible] cooking, by which [illegible] heat, cooking [illegible] meals, and [illegible] cleaning.
8. Economize in use of water heater by [illegible] baths, washing dishes, cooking and [illegible] hot water heating equipment and [illegible] heating.
9. Economize in use of [illegible] heater by [illegible] heating [illegible] and [illegible] heating.

The cooperation of everyone during extreme cold weather should make it possible for us to have enough gas to avoid [illegible] and [illegible] which we are sure [illegible] do not intend to [illegible].

Amarillo Gas Company

Cooking displays designed for gas company use.

Victory Cooking Displays Aid Home Front

THE foods we produce commercially in this country along with thousands of Victory Gardens will probably be ample providing we share and share alike. To meet the needs of the fighting forces, rationing and food shortages are changing the home front radically. Homemakers are having economies and food conservation forced upon them and they are willingly complying because they know now that what they save will help.

All this makes Victory Gas Cooking increasingly important . . . . homemakers realize that they must get their full vitamin values out of their food quotas in order that their families may continue to receive properly balanced and health-building, nutritious meals.

To carry out these thoughts, Bishop Publishing Company, 427 W. Randolph Street, Chicago has designed and produced for gas industry use the Victory Gas Cooking Displays illustrated above. These displays should prove of great value to Home Service Departments as well as for use on sales floors of gas companies throughout America. Food is one of the important ways to help bring Victory—more quickly.

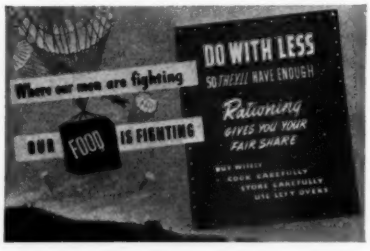
Gas Men To Till Victory Gardens

THE Brooklyn Union Gas Company will encourage a victory garden program among its 4,000 employees, even to the extent of supplying ground and having it plowed and fertilized, Clifford E. Paige, president of the company, announced recently.

The program will be conducted on the five or six acres of unused land which the company has in sections of Brooklyn and Queens. The land will be divided into 250 to 300 twenty-by-forty-foot plots and offered to the employees for cultivation. All the employees have to do, Mr. Paige said, will be to sow the seeds, cultivate and weed the plants and use the produce on their own tables.

Brooklyn Union's Gas Club has announced formation of a committee which will distribute practical information on the planning of Victory Gardens, what to plant, which varieties grow best in and around Brooklyn, and which in general will serve as a clearing house for all the miscellaneous information an inexperienced gardener needs. Late in the summer the club plans to sponsor a "country fair" at which gardeners will display their produce.

Timely Display Service



Reproduced here is a background display which ties-in with one of the official campaigns for March recommended by the Office of War Information. The background is 40 x 60 inches in size and is printed in five to eight colors on heavy board. The art work and approach follow closely the general outline of one of the most important OWI nationwide campaigns for March. Companies interested in additional information on this display for show windows should write direct to Timely Service, 46 Walker Street, New York, N. Y.

Gas Institute Expands

WITH the increased demands of war research calling for additional personnel, the Institute of Gas Technology, Chicago, has added four men to its staff, it has been announced by Harold Vagtborg. The new appointments give the Institute a staff of 27 members.

The four new staff members, Dr. Samuel William Martin, George Jay Verbeck, Cornel Wohlberg and Vito Charles Lazzaro, were appointed to the fundamental and applied research staff as research associates.

Dr. Martin was formerly with the National Lead Company, Titanium Division, where he was a research physical chemist. For a time he taught physical chemistry at Yale University where he received his Doctor of Philosophy degree. He received his Bachelor of Arts degree from Williams College and did post doctorate work at Princeton University. His appointment was effective Feb. 1.

Mr. Verbeck, formerly a research chemist with Abbott Laboratories and the Portland Cement Association, joined the staff Jan. 11. His undergraduate work was done at Lawrence College, and he received his Master of Science degree from the University of Chicago.

A graduate of Polytechnic Institute of Brooklyn with a Bachelor of Science degree, Mr. Wohlberg did analytical and laboratory work at the National Lead Company, Titanium Division, from 1930 to 1935. For the next three years he did research work for that company. He went to the Institute Feb. 1.

Mr. Lazzaro, prior to going to the Institute on Feb. 8, did research work for the West Virginia Pulp and Paper Company for five years. He also formerly served as laboratory instructor in qualitative analysis and inorganic chemistry at Tufts College where he received his Bachelor of Science degree.

Lone Star Meets Record Demand

THE greatest demand for gas service in the company's 34-year history was registered by the Lone Star Gas Company, Dallas, Texas, during January's near zero weather in that vicinity. Advance preparations added to facilities already standing by for such emergencies made uninterrupted service possible to war industries, military concentrations and domestic customers despite the lowest temperature in ten years.

An all-time peak output for 24 hours was experienced on January 18 when the company sent out 45 million cubic feet more than the previous high mark. On the following day a new high was set when the sendout was 48 million cubic feet greater than on January 18. The record output was due to extreme demands of work-laden war plants, military posts and heavier population in company territory.

Nutrition at Work . . . *Gas Companies Cooperate in Red Cross Educational Program*

• Coinciding with the National Red Cross War Fund drive in March and the inauguration of the point system of rationing food, this description of the Red Cross nutrition program and the valuable aid of gas utility home service departments, is of timely significance. Miss Bakkie pays generous tribute to the industry's cooperation and points the way to even greater usefulness in solving the wartime food problem.

By MELVA B. BAKKIE

Director, Nutrition Service, American Red Cross, Washington, D. C.

HAVING less of some kinds of foods than they have been accustomed to purchasing, homemakers who learned the hows and whys of good nutrition will have a unique opportunity to practice it under point rationing. During the past year, 283,774 persons, mostly homemakers, completed Red Cross Nutrition classes. In addition 83,764 completed Canteen courses and volunteered to serve with Red Cross Canteen Corps for emergency feeding should a disaster occur due to natural causes or enemy action. To keep families and war workers strong and healthy under longer hours, longer work weeks, and food limitations, homemakers can with imagination and ingenuity put their newly acquired nutrition knowledge to good use.

Army of Homemakers Trained

The training of this civilian army of homemakers through Red Cross classes was the accomplishment of some 12,000 instructors, many of whom served on a volunteer basis. Many of the instructors were loaned by the agency or organization employing them to teach for the local Red Cross chapter. Public schools, hospitals, gas and electric companies, Health and Welfare Agencies, the Extension Service, and Farm Security Administration were sources for the recruiting of qualified instructors to meet increasing requests for Nutrition and Canteen classes. The marked expansion in Red Cross nutrition activities was facilitated by the splendid cooperation which these agencies and organizations gave Red Cross chapters. The home economists of the home service departments of gas companies were well represented in the group of Red Cross instructors.

These home economists developed discussions of foods and nutrition through demonstrations with the use of modern equipment in a model kitchen. The food demonstrations were always popular with the homemakers who were eager for new recipes and ways of adding variety and attractiveness to their meals. The home service departments of gas companies, with their equipped auditoriums, proved an attractive and easily accessible meeting place for Red Cross classes. Red Cross chapters have greatly appreciated the availability of these departments since increased wartime production activities have overtaxed the limited space at chapter headquarters.

Nutrition Interest Grows

Interest in nutrition continues. As point values are established, homemakers will be concerned with the problem of learning how to use points wisely to get the most out of them when they go to market. In order to save money and points homemakers will be preparing more foods at home. Because of this, they will be

Red Cross Canteen Course conducted by the gas company at Norfolk, Virginia

eager to attend wartime food demonstrations seeking suggestions for extending flavors of rationed foods, for using new alternate foods, and making meals more attractive when there is less variety.

As the need increases for community group feeding projects such as school lunches and lunches at child care centers, interest in training in group feeding will be accelerated. Women will be recruited for Canteen classes to prepare them for this important community service.

Nutrition programs are changing with new developments on the food front. These developments will increase the need for nutrition education. The Red Cross will continue to promote nutrition education. The fine cooperation of gas companies and their staff of home economists help make the Red Cross chapter and community nutrition programs work.

Safety Trends

Contributed by the Accident Prevention Committee

Edited by W. T. Rogers, Ebasco Services Inc., New York, N. Y.

SEASONAL ACCIDENTS

A NUMBER of slipping accidents due to ice have been reported: Workmen fell down stairs near a gas holder. Stairway had railings on either side, neither of which was used by the employee. Falling, he struck his head and wrenched his knee. He was wearing rubber overshoes at the time of the accident.

Inspector got out of car, slipped on ice and hit the back of his head against the open car door, injuring his spinal column. This accident resulted in a very painful injury and the loss of several months' time.

Another different type of "ice" accident occurred when a foreman was hit by falling icicle; he was not wearing his "hard" hat. First-aid was administered.

Rubbers cannot be depended upon—there seems to be no substitute for vigilance and caution in icy weather.

AUTOMOTIVE ACCIDENTS

TWO recent accidents are reported which we can say "follow traditional" lines. Since accidents of this type are still happening we must continue to warn against them.

Pickup truck was parked in driveway of employee's yard. Employee walked across yard, got in pickup truck and started backing out of driveway. Employee was looking to the rear as he backed, but another car came up from the right and stopped across driveway to deliver milk to employee's house. Employee did not see other car and a ladder in pickup truck struck other car, breaking the glass and denting the other car.

In some cars and trucks it is virtually impossible to see the entire driveway from the rear or side windows while backing, but drivers should never back until they know it is *absolutely safe*. Helpers, or even bystanders, should be pressed into service to guide the driver, whenever possible.

A truck was going west on Blank Street and attempted to make left turn into Dash Street. Another car was going in the same direction as the truck and going straight through the intersection. Both vehicles were moving at about eighteen miles per hour. The company driver failed to give left turn signal and as he started to make the turn, the truck struck the right side of the other car, doing considerable damage.

The report indicates that the truck was in proper lane for making a turn. The other driver probably violated a safe driving practice in passing the truck at the intersection. However, since the company driver failed to give the proper hand signal he must be blamed for this accident. Most intersection turning accidents can be prevented by using the proper lane and giving the proper signal.

THINGS WE DO WHICH CAUSE ACCIDENTS

C. L. HIGHTOWER, safety director, United Gas Pipe Line Company, Shreveport, Louisiana, and chairman, A. G. A. Accident Prevention Committee, submits the following safety meeting discussion material:

"By doing the wrong thing at the wrong time we mean taking unnecessary chances, working with undue haste and following unsafe practices.

"Men do not do these things intentionally. Nobody wants to get hurt or to hurt anyone else, but through worry, indifference, or lack of knowledge, we do things that set the stage for an accident.

"A thorough knowledge of the job at hand and constant mental alertness are the two primary safeguards against this type of accident. The one is acquired by continuous thought and study, and the other by observing proper habits of rest and recreation, and by avoiding worry.

"A discussion of the following questions should help all of us to better understand how these accident situations develop and what to do to guard against them:

1. Why are accidents more likely to occur on rush jobs?
2. Is it possible to work with speed and do the job safely? How?
3. What steps are necessary to insure that members of a crew understand the job that is to be done and that their efforts are coordinated?
4. What is the usual reason for using the wrong tool such as using a wrench for a hammer?
5. How can this practice be overcome?
6. What is the danger of jumping over ditches, pipe, and other such material?
7. Does the time saved justify taking the chance?
8. If you were breaking in a new man on your job, what safety instructions would you give him?
9. How can one man on the job distract the attention of those he is working with?
10. What causes a man to have a lapse of memory, or let his mind go 'wool gathering?'
11. Can anything be done about this?
12. Who loses when you get hurt?"

National Safety Council poster.

Captain Hungate

IN an article in the January issue of the A. G. A. MONTHLY entitled "Serving on All Fronts," Captain L. H. Hungate, Jr., now with the Army and Navy Munitions Board, was listed as being with the Louisiana Power & Light Company immediately prior to joining the Army. This was incorrect as Captain Hungate was connected with the United Gas Corporation at the time he received his commission, having previously been associated with the Louisiana company.

Personal AND OTHERWISE

American Meter Elects McKean President

Norton McKean

AT a meeting of the Board of Directors of American Meter Company, Norton McKean was elected president to fill the vacancy caused by the recent death of Francis H. Payne. Mr. McKean was formerly vice-president, treasurer and general manager.

Elected vice-presidents were John C. Diehl, formerly chief engineer, with headquarters in Erie, Pa., and Arthur E. Norton, formerly manager of the company's factory in Boston. Mr. Diehl was also appointed to serve as manager of the Metric Metal Works Plant in Erie, Pa. A. McW. Wolfe, the assistant manager in Boston, was promoted to the managership of the Boston plant serving the New England area.

Calvin A. Nichols, controller and assistant treasurer, has been made acting treasurer.

Arthur F. Benson, formerly assistant chief engineer, was promoted to chief Engineer of the company.

It was also announced that John B. Klumpp, consulting gas engineer with a long and distinguished career in the utility field, had been elected to the company's Board of Directors.

Hobson Heads Roper

AT the annual stockholders' meeting and a subsequent directors' meeting held at the Geo. D. Roper Corporation offices January 26, S. H. Hobson was elected a member of the board of directors and president to succeed Mabon P. Roper, who died recently.

Shelby L. Large and Hugo L. Olson of Rockford and Bert Pratt and J. Sanford Otis of Chicago were reelected to the board of directors.

All officers of the company were reelected including W. E. Derwent, E. Carl Sorby and J. P. Curtin vice-presidents and Floyd K. Lawson, secretary-treasurer. Manufacturing operations will be under the supervision of works manager Otto Olson.

Mr. Hobson, who is a well-known figure in the gas industry, started with the Roper organization 28 years ago and moved progressively from assistant foreman up to the presidency.

Smith Heads Southern Gas Association

Frank C. Smith

FRANK C SMITH, president of the Houston Natural Gas Corp., was named president of the Southern Gas Association at a recent meeting of that organization at Memphis, Tenn. The association, organized in 1908, represents 14 southern states and embraces a membership of more than 500. The recent session, streamlined in every respect, was held in lieu of the large annual convention usually scheduled for February.

Mr. Smith, who served as first vice-president in 1942, was elevated to the presidency to succeed Leslie B. Denning, Jr., of the Lone Star Gas Co., Dallas, Texas. Other officers elected were: First vice-president, Frank S. Kelly, Jr., Arkansas Louisiana Gas Co., Shreveport, La.; second vice-president, Clayton L. Nairn, New Orleans (La.) Public Service Co.; secretary-treasurer, L. L. Baxter, Southern Union Gas Co., Fayetteville, Ark.

Succeeds Father as United Fuel Head

HARRY A. WALLACE, JR., became president and general manager of the United Fuel Gas Co. and associated firms, Charleston, West Virginia, on February 1, as his father Harry A. Wallace, Sr., retired.

The elder Mr. Wallace traced his career from a field foreman in 1898 for the Hope Natural Gas Co. in Wetzel County to the presidency of one of the world's largest producers of natural gas.

He was president and general manager of the Warfield Natural Gas Co., the Central Kentucky Natural Gas Co. and other associated concerns of the Charleston group of the Columbia Gas and Electric Corp.

Elected to American Standards Board

R. G. Griswold

ROBERT G. GRISWOLD, president of Electric Advisers, Inc., New York, N. Y., has been elected a member of the Board of Directors of the American Standards Association for a three-year term as a representative of the American Gas Association. Recognized in the gas industry as an able and experienced engineer, Mr. Griswold will make a most valuable addition to the board of the national standards organization.

A graduate of the University of Wisconsin, Mr. Griswold entered the gas industry in 1905 as a cadet engineer for the Denver Gas & Electric Co., Denver, Colo. He remained with this company until 1912 during which time he did important engineering work in the design of gas purifiers and gas distribution systems and directed the Doherty Training School for engineering college graduates.

From 1912 to 1935 he was associated with Henry L. Doherty & Co., New York, first as engineer and then, for 20 years, as chief technologist. During this period he made many authoritative contributions to the gas and oil industries. He became chief technologist of Cities Service Co., New York, in 1936 and in 1938 was named president of Electric Advisers, Inc.

As a past chairman and member of the Managing Committee of the Technical Section, American Gas Association, and member of numerous committees over a long period of years, Mr. Griswold gained an enviable reputation in national utility affairs. Among the committees on which he has served are: Distribution Design, Economic and Engineering Survey of the Gas Industry, Drafting Gas Industry Safety Code for Installations and Work in Buildings, and Listing Requirements for Appliance Thermostats and Automatic Pilots (chairman).

He is also active in the American Petroleum Institute and a member of the American Chemical Society, American Society of Mechanical Engineers and The Franklin Institute.

On Honors List

SIR FREDERICK J. WEST, chairman of West's Gas Improvement Company, Ltd. and immediate past president of The Institution of Gas Engineers, England, is now a Knight of the British Empire. This high honor was announced in the New Year Honors List. Sir Frederick is well known in the American gas industry.

Marguerite M. Del Genio, a former employee of the American Gas Association in New York, is now attending Officers' Candidate School of the Women's Auxiliary Army Corps at Des Moines, Iowa. Following completion of her course of study early in March she will receive her assignment as a commissioned officer

Ebasco Elects

T. C. WESCOTT, engineering manager, and Harold H. Scaff, comptroller, have been elected vice-presidents of Ebasco Services Incorporated, the service organization of Electric Bond and Share Company.

Advanced by A.G.A.

THE following appointments to American Gas Association staff positions were announced February 15 by Alexander Forward, managing director of the Association:

Edward R. Martin, to be supervisor of statistical activities, and Thomas J. Shanley, to be supervisor of statistical research.

Mr. Martin and Mr. Shanley have been members of the Association's statistical staff for a number of years.

Five Gas Men Win McCarter Awards

FIVE more gas company employees recently joined the growing list of men honored by the gas industry for having performed outstanding acts of life saving by application of the Schafer prone pressure method of resuscitation. They received McCarter awards for their quick and effective actions.

Herbert Carter, fitter, customers' service department, The Philadelphia Gas Works Company, received national recognition for the second time on January 29 when he received a McCarter bar to add to the McCarter medal which he had won previously. The presentation was made by P. T. Dashiell, vice-president, at the president's staff meeting.

On the same date, two other Philadelphia Gas Works men, James Gobe, appliance inspector, and Daniel Harkins, appliance inspector, received McCarter medals for their rescue work.

Donald Haggerty and James S. Warner, fitters employed by the Public Service Electric & Gas Co., Trenton, N. J., were awarded the McCarter medal and certificate of assistance respectively on January 8 for saving the life of a Trenton man who had been overcome by gas.

The awards are made by the American Gas Association through the generosity of Thomas N. McCarter, chairman of the board of Public Service Corp. of New Jersey.

Named Consolidated Edison Trustees

H. C. Davidson

HERBERT C. DAVIDSON and W. Gibson Carey, Jr., were elected trustees of Consolidated Edison Company of New York, Inc., on January 26. Mr. Carey is president of Yale & Towne Manufacturing Company, and Mr. Davidson is a vice-president of Consolidated Edison Company.

Mr. Davidson has been vice president and chief accounting officer of Consolidated Edison System companies since 1938. He was born in Melrose, Mass., and graduated from Harvard University in 1904. He had several years' business experience in Boston and New York, and in 1913 joined the Standard Gas Light Company, which was one of the companies in the Consolidated Edison System. In 1919 he was transferred to the parent company (then known as Consolidated Gas Company) and in 1920 he was appointed controller. He was elected secretary of the company in 1924, and served in that capacity until he became vice-president in 1938.

Mr. Carey has been president of Yale & Towne since 1932. He was president of the U. S. Chamber of Commerce during 1939-1940.

James W. McMahon Dies

JAMES W. McMAHON, president of the Northwestern Ohio Natural Gas Company from 1905 until his retirement in 1928, died Feb. 7 in Toledo, Ohio. He was 86 years of age.

A natural gas industry veteran, Mr. McMahon was a member of the Natural Gas Association of America for a period of years beginning in 1909.

William A. Baehr Dies

WILLIAM A. BAEHR, former president of the North Shore Gas Company, Chicago, Ill., died Feb. 18 at his home in Glencoe, Ill. He was 67 years old.

A member of the American Gas Association since 1918, Mr. Baehr was prominent in national utility affairs.

CONVENTION CALENDAR

MARCH

Mar. 11-12 **A. G. A. War Conference on Industrial and Commercial Gas**
Hotel Statler, Detroit, Mich.

18 **New England Gas Association**
Hotel Statler, Boston, Mass.

APRIL

Apr. 16-17 **Missouri Association of Public Utilities**
Elms Hotel, Excelsior Springs, Mo.

27-28 **A. G. A. Accounting Conference**
Hotel Gibson, Cincinnati, Ohio

26-29 **U. S. Chamber of Commerce, Annual Meeting**
New York, N. Y.

28 **A. G. A. Natural Gas Management Conference**
Hotel Gibson, Cincinnati, Ohio

29-30 **A. G. A. Distribution Conference**
Netherlands-Plaza Hotel, Cincinnati, Ohio

MAY

May 10-14 **National Fire Protection Association**
Chicago, Ill.

JUNE

June 7-9 **National Office Management Association Annual Conference**
Detroit, Mich.

18-21 **American Home Economics Association**
Jefferson Hotel, St. Louis, Mo.

NOVEMBER

Nov. 29-Dec. 3 **American Society of Mechanical Engineers, Annual Meeting**
New York, N. Y.

A New Plan of Bi-Monthly Meter Reading with Monthly Billing

By R. C. Gordon

The Narragansett Electric Co., Providence, R. I.

PRIOR to the installation of bi-monthly meter reading and the estimating of the reading for the off-reading month, we were faced with manpower and transportation shortage due to war and local employment conditions beyond our control. After a study of various methods used by other companies, we came to the conclusion that in order to simplify the estimating procedure and to eliminate insofar as possible the customer complaint angle we should have not only a firm back-up of the estimate, but that it was also highly important that the customer should know just why and how we estimated his bill.

Our first step was to determine how and on what accounts to estimate. Under the existing plans studied, the most universally used were: (1) Use of the corresponding month's consumption of the previous year, (2) Average of the previous three months' consumption adjusted according to seasonal trend.

We found a number of objections to both these plans; the four outstanding objections were: (1) Slowing up of answering customers' questions, (2) Change of living conditions of the customer, (3) Time of preparing and accuracy of estimating, (4) Difficulty in explaining to the customer the detail of arriving at the estimate.

Previous Month's Consumption Used

In order to overcome these objections to the greatest possible degree, we came to the conclusion that by using the previous month's consumption we would obtain the same results, eliminate the principal objections to the other plans, and be in a much better position as far as the customer's interests were concerned.

As to what accounts to estimate, it was decided that all Domestic Gas and Electric accounts and all Commercial that fell under an established minimum consumption would be estimated. These plans were built around the advanced punch card method of billing, but can be used under any billing procedure be it hand or stub machine billing.

The next step was to lay the plans concerning how we were to reach each customer with our story, telling why it was necessary to render estimated bills and giving a simplified yet complete picture of the way we were going to estimate. It was decided that we would print the complete story in pamphlet form, explaining in detail the reason and methods. These notices were enclosed with all bills during the first month the plan was in operation. Prior to rendering the bills, we inserted similar notices in the local newspapers.

A comparison of our reading personnel prior to and after the adoption of the bi-monthly meter reading reflects the general outline of what we were able to accomplish.

From the above it will be noted that:

(1) The Demand Group increased two readers, due to the increased load of reading commercial meters that have a known consumption over the established minimum for estimating.

(2) There is a reduction of three machine readers, which also made possible a corresponding decrease of 36,000 yearly car miles, equivalent to 37.5 per cent of our previous meter reading mileage.

(3) There is a reduction of twelve foot readers.

(4) The addition of four transcription clerks who transcribe the previous month's reading as outlined below.

Type of Reader	*Prior to Bi-Monthly*	*After Bi-Monthly*
Demand Readers	4	5
Special Demand and Foot Reader	—	1
Machine Readers and Collectors	2	2
Machine Readers	3	1
Machine Skip Readers	1	—
Foot Readers	25	14
Foot Skip Readers	2	1
Total Readers	37	24
Transcription Clerks	—	4
Total	37	28

R. C. Gordon

The above was accomplished with a minimum of employee education. The following detail procedure outlines the various steps in arriving at the estimated reading and billing.

Procedure

The billing procedure is based upon the advance punch card plan, which is to create an advanced card automatically with all possible data reproduced from the current month's billing card. Routes that are to be read cannot be prepunched with reading and amount figures for the next month's bill; however, reading, consumption, and amounts can be reproduced for those routes that are to be billed on an estimated basis providing the procedure is based upon the previous month's consumption. We obtain this advanced billing data through reproduction as stated above, and by creating in the advance card the current month's present reading in the previous reading column and the consumption in the consumption column. This is done by cross-

wiring the present reading and date fields to the previous reading and date fields of the new card. The advanced cards are then run through the multiplier which adds the consumption to the previous reading and punches the product in the present reading field.

The advanced billing cards are then interpreted and forwarded to the bookkeeping stations, where they are filed pending current changes and transcription to the meter reading books. The transcription or estimate clerks transcribe from the interpreted data on the advance card only the estimated present reading in the meter book; the absence of consumption figures in the meter book indicates that the reading and billing is estimated. If, when transcribing, the clerks see any unusual consumptions in the previous month's actual readings, they figure a new estimated reading. This is done by averaging the previous actual readings, or if there appears to be a complicated difference, same is turned over to the supervisor for investigation. The new estimated reading is entered in the meter book and the advance card is partially destroyed and placed on top of the pack, for reproduction, using the new estimated readings as the ensuing month's reading.

At the present time, this procedure requires approximately seventy-five per cent of the transcription clerks' time, transcribing on an average of 1,100 estimated readings in the six-hour period. The balance of their time is taken up with other general duties, such as cash posting, service order entries, checking, etc.

A general summary of what we have accomplished by this procedure outlined above would run something like this:

(1) We have a simplified method of estimating, requiring a minimum of manual work.
(2) There has been no noticeable fluctuation in the monthly revenue.
(3) Customers' relations have not been interfered with, complaints have not increased as much as expected. Many of these complaints can be traced to the fact that the customer did not read the published notice or the one enclosed with the bill. A contributing factor to any increase of customers' questions can be traced to the large turn-over in reading personnel.
(4) Personnel turn-over during the year of 1942 was 51 replacements for 37 meter readers. However, with all of this, we are still able to maintain the established bi-monthly reading schedule.
(5) Under our method of advance card billing where the advanced card has been prepunched with reading, consumption and amount, we were able to reduce billing operations, clerical help and billing errors.
(6) Actual dollar savings in meter reading labor and transportation costs, also an overall savings in billing preparation in the Tabulating Department.

There are other features that individually are of a minor degree, but taken collectively make for a better and more satisfactory method of operation.

Accountants Meet in April

A joint Accounting Conference sponsored by the American Gas Association and the Edison Electric Institute will be held April 27 and 28 at the Netherlands-Plaza Hotel, Cincinnati, Ohio. Numerous war problems will be discussed by national accounting authorities. It is also expected to devote some time to post-war adjustments. Details of the program will be announced in the April A. G. A. MONTHLY.

House Heating Survey Shows Gas Gains

RESULTS obtained from the fifteenth annual survey of gas central space heating installations in the United States and Canada made by the A. G. A. statistical department show that gas fuel scored substantial gains in this field. The survey includes reports from 240 companies, listing the number of installations connected to their lines as of July 1, 1942 and July 1, 1941.

The total number of central house heating installations reported by the 240 manufactured and natural gas companies included in the survey was 303,083 on July 1, 1942. This was an increase of 47,386, or 18.5% as compared with July 1, 1941. Installations in manufactured and mixed gas territory showed a pronounced gain for the year, amounting to 21.1%, while natural gas installations registered an increase of 16.2%.

The manufactured and natural gas companies reported increases in all types of equipment, gas-designed and conversion jobs, boilers and furnaces. However, straight gas design jobs showed a larger percentage increase than did conversion burners.

According to the Bureau of Census, Department of Commerce, the total number of gas-fired central house heating installations in occupied dwellings connected to the lines of all United States gas companies in 1940 amounted to 1,108,889. In addition there were 2,724,155 occupied dwellings heated by gas-fired space heaters, floor furnaces, etc. giving a total of more than 3,833,044 occupied homes in the United States that are heated by gas.

The complete report is available upon request to the Association at 420 Lexington Ave., New York, N. Y.

Fuel Adjustment Clauses

AN increase in utility rates, even though made as the result of automatic adjustment clauses based on increased taxes, fuel costs and similar items, cannot be made without prior notice to the Office of Price Administration, OPA ruled February 10.

In a formal interpretation, OPA held that such rate increases come within the provisions of the Emergency Price Control Act as amended and OPA Procedural Regulation No. 11 even though the automatic adjustment provision in the utility company's contract may have been made before the Price Control Acts were enacted.

The act provides that no public utility shall make any general increase in its rates or charges which were in effect September 15, 1942, unless it first gives 30 days' notice to the President or such agency as he may designate. The Office of Price Administration has been designated as that agency by the Director of Economic Stabilization. The utility must also consent in these cases to the intervention by OPA before the regulatory agency having jurisdiction over the rates.

No Envelopes

ACCORDING to the *Gas World,* many gas companies in Britain "are planning to save the country thousands of tons of paper per annum, by discontinuing the use of envelopes when sending out accounts."

Gas Institute Utilizes Trained Manpower

A TWO-POINT program to make maximum use of critical scientific manpower in the gas industry technical training program will go into effect immediately at the Institute of Gas Technology, according to an announcement by Harold Vagtborg, the Institute's director.

New selectees for fellowships at the Gas Institute are scheduled to begin their regular training program at the Gas Institute in June, but because so many colleges are operating under wartime accelerated programs, graduation dates of the new fellows vary considerably. At least two of the new Gas Institute appointees will complete their regular college training in March.

So provision is being made under the new program to make maximum use of these extra man hours. The new fellows will be assigned to Gas Institute war research projects as rapidly as they complete their college training and will work at this activity until their regular training program starts.

Then, in the second stage of the program, these men will commence their specialized training by being assigned to actual practice in the gas industry.

Post-War Market for Gas Refrigeration Indicated in Apartment Survey

By RAYMOND G. REES

The Peoples Gas Light & Coke Co., Chicago, Ill.

WITH the entry of the United States into the present war, restrictions on the sale of gas refrigerators for apartment building use were expected because of the diversion of production to specific materials of war. While it is true that for the first few months of last year sales of gas refrigerators for apartment building use were vigorous, the visible supply soon dwindled to a point where it was necessary to refuse orders for such installations.

The apartment building division of Peoples Gas, which is a specialized selling operation, found itself in a position similar to other dealers in domestic consumer equipment. In other words, we found we had an interim problem concerning our selling group. Fortunately, the continued operation of the apartment house division has been made possible by the conclusion that in the post-war period there would be a large public demand for gas refrigerators, and consequently that it would be highly productive to maintain close consumer contacts in order to establish trustworthy records of qualified prospects.

Market Factors

This concept of a post-war prosperity era has been recently strengthened by the contemplated plans of the President and the Congress to provide employment for the millions of soldiers and civilian defense workers who will be immobilized, to a large extent, soon after the end of the war.

In order to determine what the possible immediate market might be at the close of hostilities, the apartment house division took as a sample, 3,000 Chicago apartment buildings containing from 4 to 60 apartments. These 3,000 apartment buildings were visited and a survey made to determine the type of refrigeration installed in the separate apartments, their degree of model obsolescence, and the condition they were in as regards efficiency and general overall acceptability.

It might be mentioned in passing that every apartment in these buildings was equipped with some kind of automatic refrigeration. Of these 3,000 apartment buildings, 625, averaging 12 apartments each, were found to be equipped 100 per cent with gas refrigerators. In questioning gas refrigerator users, the owners of these approximately 7500 expressed an amazing agreement as to the exceptional performance of these units. More impressive than any other comment was the value placed on the continued quietness—and this regardless of their age. This, of course, is easily explained in that the absence of moving parts precludes any noise. The same absence of moving parts is responsible for the exceptionally low maintenance costs on gas refrigerators. These points, expressed by the tenants and corroborated by the apartment building owners or managers, are outstanding testimonials which have contributed heavily to the tremendous increase in acceptance of the gas refrigerator wherein only a tiny gas flame provides the entire refrigeration service.

During visits to apartments where gas refrigerators were installed, our representatives took considerable time in giving the users suggestions as to how to economize in gas costs by proper refrigerator use. Buying ideas, and the better methods of loading refrigerators were amongst the more helpful information left with each customer.

Gas Refrigeration Favored

In 1,040 of the remaining 2,375 apartment buildings covered, 5,009 out of 13,800 automatic refrigerators were gas refrigerators. Due to the close proximity of apartment building dwellers, most of the families who were using other types of automatic refrigerators expressed a knowledge of the gas refrigerator and the hope that at the end of the war they too would be privileged to see it installed in their apartments. It was immediately apparent to us, even in this segment of the apartment buildings visited, that there were 8,800 highly qualified prospects.

In 1,335, the remainder of the 3,000 apartment buildings contacted, while the proportion of gas refrigerators to other automatic refrigerators was somewhat less, there still persisted an undeniable preference for the gas refrigerator.

In order, then, to determine the probable magnitude of an immediate market for apartment building gas refrigerators at the close of the war, we decided to eliminate the 625 completely gas refrigerator equipped apartments and only consider the 1,040 that were previously equipped, to a relatively high degree.

As was pointed out above, in this group, 5,009, or approximately 36 per cent, were experiencing the plus performance of the gas refrigerator. It was intimated also, however, that the remainder, or 64 per cent, appreciated the economy and silence of the gas refrigerator and hoped after the war that they would be able to install this type of refrigerator.

It so happens that the total of this type of apartment building in Chicago is approximately 13,500, and containing, also approximately, 108,000 apartments. It is just a matter of elementary arithmetic to conclude that the number of qualified prospects for apartment building gas refrigerators reaches the interesting figure of approximately 70,000.

With this number of prospects immediately available when gas refrigerators are again in full production and are released for general distribution, there is every reason to believe that the gas industry will find, in the added number of newly connected gas refrigerators, a definite promotional opportunity to increase our highly desirable domestic load.

From "The Big Four" published by The Peoples Gas Light & Coke Company.

Gas Companies Support Nutrition Program

THE Home Volunteer Nutrition program is being promoted actively by 450 gas companies among 11,000,000 housewives throughout the country, it has been announced by George S. Jones, Jr., vice-president of Servel, Inc., of Evansville, Ind., which company planned the project in cooperation with the U. S. Government.

Three hundred of the larger war industries are using the Nutrition in Industry plan that Servel also devised as a contribution to the war effort as an extension of the Home Volunteer Nutrition programs, Mr. Jones said. In many places, gas companies are just beginning to interest industrial concerns in this program, which has proved a valuable channel for human and trade relations. The Nutrition in Industry plan was worked out in conjunction with the U. S. Government agencies and the National Research Council.

The nutrition programs have helped to establish the gas companies as foremost in the food and nutrition fields.

Executive and Planning Groups Urge National Advertising Support

THE post-war program of the gas industry took another step forward when the Executive Board of the American Gas Association at a meeting in New York February 16 adopted resolutions urging more active participation in the industry's national advertising program and recommending industry support for an aggressive building insulation program. Specifically, the board adopted the following resolutions presented by the Post-War Planning Committee, A. M. Beebee chairman:

1. In view of the many forces that are at work created by the war, by competing industries, and by various phases of social and economic planning, it is vital to the welfare of our industry that we actively support, promote and further develop the National Advertising Program of the gas industry.
   The Post-War Planning Committee is now developing data to bring to the attention of the industry the seriousness of the situation outlined above. In the meantime, however, we feel it important to call this matter to the attention of the gas industry at the earliest possible moment, so that no time will be lost in lending our support to this most vital activity.
2. Because of the needs of the country generally at this time, it is recommended that the gas industry give wholehearted support to the promotion of building insulation. Such a move not only fits in very definitely with the national need at this time but when the post-war season is on us, every home that is insulated can better afford to consider the use of gas fuel.

In reference to the latter resolution, attention was called to the splendid 1942 home insulation campaign of natural gas companies in the Pittsburgh area—Equitable Gas Company, Manufacturers Light & Heat Company, and Peoples Natural Gas Company. This campaign, which included a large scale advertising program conducted throughout the Fall months, had the primary objective of assisting the government in the conservation of gas. Further objectives were the development of a greater potential market for gas house heating and the betterment of relations with the dealers and the consuming public.

It was reported at the meeting that a large number of companies have carried out the committee's initial recommendation that an executive in each gas company be designated to study the question of post-war planning from the company's viewpoint and to cooperate with the national post-war program. The national program was outlined in an article in the January issue of the A. G. A. MONTHLY.

Wartime Conservation of Natural Gas Emphasized in Pittsburgh Program

F. B. JONES, general sales manager, Equitable Gas Company and Pittsburgh and West Virginia Gas Company, has announced a recent change in the gas sales and service organization of these companies to render more effective their war-time program on conservation and wise use of natural gas. This change includes a new title for the former Promotion Department, now known as the Conservation Department, with W. S. Redpath as manager.

This organizational adjustment, designed for the duration and intended to bring about the most effective tie-in with the government's fuel conservation activities, may appear at first sight to be an about-face on the part of a group which was successfully active, not so long ago, in selling more gas at every opportunity. Now, with limitation orders placing strict controls on the sale of gas and gas appliances, additional effort on the companies' part to urge customers to use gas wisely and economically may seem to be "promotion in reverse."

Actually, as Mr. Jones explains, this conservation program does not represent any marked departure from one important objective of peacetime selling activities. It has always been a basic endeavor of gas sales operations to develop the highest practical efficiency and consequently the lowest operating cost in customers' use of gas. As these objectives have been steadily approached, the markets for industrial gas, house heating and other uses of the fuel have continued to widen and be developed.

This formula of cutting costs and improving the "use value" to extend the market is of course well-tried and proven in many industries. So with gas service, there has been a constant effort toward the objective of effecting greater economy, to discourage wasteful use and to bring about a still wider public recognition of the value of this fuel. War conditions, however, have temporarily prevented gas utilities from taking on the new loads which are stimulated by increased public acceptance.

An interesting example of this kind of conservation effort was the campaign on insulation, storm sash and weatherstrip sponsored jointly by the Pittsburgh gas companies in the late summer of 1942. The several thousand Pittsburghers who have since "winter-conditioned" their homes (the majority heated by coal) have not only made a real contribution to the war effort in saving fuel and transportation but have also gained a much keener appreciation of the economy and greater comfort of a properly insulated house. The effect is now being multiplied many times by the word-of-mouth advertising extended to neighbors and friends. This particular conservation activity has already developed many new prospects for gas-heating in post-war years.

Obviously, conservation, in the sense of this example, is far different from an attempt to withdraw the delivery of gas for certain applications and to confine its use to selected applications in narrowed markets.

Mr. Jones also states that his company has maintained its force of industrial utilization engineers at approximately its pre-war level in order to give full assistance to industrial consumers, practically all engaged in war production. These industrial men who formerly built new load have now turned their experience and talents to the aid of industrial consumers in getting maximum efficiency from new and existing gas equipment with minimum use of critical materials.

In this conservation program, it is recognized that a relatively small percentage saving in the company's very large industrial load should contribute materially to the overall supply of wartime fuel.

Article Gives Gas Cooking Tips

THE March issue of *House & Garden* carries a timely illustrated article entitled "Cut Your Gas Bill, Help Win the War," which supports the War Production Board's gas conservation program. After explaining that lack of fuel oil and shortages of vital materials have caused concern in some states, the article points out that "the same gas that fries the breakfast bacon is a vital war material needed by production plants in turning steel into precision parts for guns, ships, shells, planes and equipment for our armed forces, as well as for thousands of industrial operations so essential to our war effort."

Fourteen tips for conserving cooking gas in the kitchen are given together with line sketches illustrating each point.

Cooking in Britain

AN inquiry conducted among 3000 housewives at the instance of the British Ministry of Health showed that for cooking gas is the fuel in 43.2 per cent of homes; coal, 16.3 per cent; electricity, 8.6 per cent.

Industrial & Commercial Gas SECTION

B. H. GARDNER, *Chairman*
CHARLES G. YOUNG, *Vice-Chairman*
EUGENE D. MILENER, *Secretary*

The Future of the Gas Deep-Fat Fryer

By S. E. TAPPAN

Gas Engineer, J. C. Pitman and Sons Inc., Lynn, Mass.

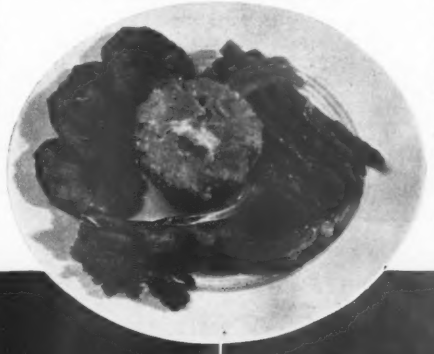
NO doubt at this late date the majority of gas appliance manufacturers, in common with our own experience, have passed through the stage of plant conversion to the point where they are now devoting 100% of their time and energy toward the supply of much-needed war materials for the government. It has been a nerve racking problem presented in a manner which allowed but little time for its solution and as such the appliance manufacturer is to be highly commended for his success. Every manufacturer who has so converted, and has overcome obstacles entirely foreign to his organization, cannot help but take pleasure in the knowledge that he is serving his country well.

Deep-Fat Fryers in the Army

In the past deep-fat fryers have enjoyed an ever-increasing popularity and importance in hotels and restaurants all over the country. Their use has covered a diversity of frying needs which has been met by the development of fryers ranging in size from the small 10-inch square counter appliance to the 12-foot automatic doughnut machine capable of turning out 500 dozen doughnuts per hour. Needless to say J. C. Pitman and Sons, Inc. is proud of its equipment now being used in many army camps and naval training stations throughout the nation and especially proud that some of the large automatic units are now in use in North Africa and Hawaii. That the gas deep-fat fryer takes its part in feeding the armed forces is in itself sufficient evidence of the important role it has assumed in the commercial kitchens of the nation.

In view of this advance and without for an instant relinquishing the effort being made toward producing the materials of war it is in order to think ahead toward the future. What are the possibilities in this field for the post-war period? What new conditions must be met? These are vital questions which, we hope, will be upon us before we realize it. Without doubt the answer to the major portion of these questions lies in attempting to visualize the kitchen of the future and in so doing gain an intimate knowledge of the requirements of the chef. Other factors of importance are a consideration of the possibilities of the use of new and different fats than are currently used, of the use of new and different foods to be fried, and of the use of new and different materials in the construction of fryers.

Fried lamb chop, potato cake and eggplant produced in gas deep-fat fryer



It may well be expected that the newer commercial kitchens to be developed after the war will be of the finest, having the latest developments in air conditioning and ventilating as well as in superior lighting and appointments. In such surroundings there is no place for inferior, crudely built fryers with resulting poor performance and lack of eye appeal. On the contrary, the demand will be for high-speed equipment possessing qualities designed for proper size and shape; fryers which will be free from service troubles, easy to repair and easy to clean. As modern domestic kitchens have demanded and received superior gas appliances so the commercial kitchen will demand and receive equipment superior in performance, cleanliness, and appearance.

Separate Frying Department

In line with the most advanced ideas in restaurant kitchen planning, the distinct importance of a separate and isolated fry station is making itself manifest in the trade. Constant high speed production of fried foods demands that the deep-fat fryer divorce itself from other kitchen equipment, made to perform entirely different duties. In this way the operation of frying foods becomes much less confusing, less awkward and is, from a standpoint of repairs, much to be desired. All of these changes will, of necessity, become influences tending to make themselves felt in the design of the deep-fat fryer.

From the many schools of the land concerning themselves with an intimate study of dietetics will come advanced ideas on the

Frying "fish steaks" by single-layer method in gas deep-fat fryer

Deep-fat frying sea food specialties in gas-fired unit

preparation and uses of fried foods. One trend now making itself felt is the production of fried steaks and chops supplementing the delicious fried fish foods more commonly known. It is beyond question that the kitchens of the future will be conducted and supervised by trained experts in the field of food preparation and rightly so, for the trend of the public will quite likely be toward the restaurant-prepared meal and away from the home. Probably a greater portion of the meals will be eaten outside the home than ever before. Even now the public is being made acutely conscious of the value of balanced meals which contain the proper amounts of the daily supply of vitamins.

As planned meals develop in popularity they will necessarily demand more concentrated attention to detail. In such cases the average man will be content to turn his food problems over to those trained and skilled in the treatment of food production. This can mean only one thing to the gas-fired deep-fat fryer—that it must closely watch the developments that come from the food laboratories and be prepared to produce equipment that will meet every requirement made of it. As dietitians come to learn more about the chemistry of fats and the preparation of fried foods the design of fryers must keep pace with such developments.

Development of New Fats

The likelihood of the development of new and different fats for use in the frying of foods is, of course, speculative but entirely within the range of possibility. The fats of today are now used at temperatures ranging from 250 to 400 degrees Fahrenheit. Suppose, for instance, a fat were produced that would shorten the time of frying to one half the amount now required; to be used at much higher temperatures. Immediately the entire design of the fryers now being constructed would need to be altered to meet the new conditions imposed upon them.

One of the chief needs of today is for faster frying without fat breakdown. If the problem were approached from the viewpoint of a different fat composition rather than from a modification of the present-day fryer its solution would be interesting to say the least. There is great need, and there will be far greater need, for the progressive manufacturer of deep-fat fryers to work closer together with the food laboratories and the fat laboratories than ever before.

As we enter the field of new materials which now will be made possible because of the intense activity of research during the war there are multitudes of possibilities. Careful investigation of materials which may be used must be made. Materials which are highly conductive of heat transfer, which lend themselves to cleanliness, which will not be affected by the acids present in fats, and which aid in the streamlined flow of gases must be objects of diligent search. At present there is astonishing progress being made in the field of plastics, some phases of which may be made applicable to the design of deep-fat fryers. The glass industry is understood to have contributed greatly to advances which may be incorporated in immersion tube installations. Plywood now appears firm, strong and durable and, if fireproofed, may be of use in construction where it is desirable to reduce heat loss. In addition to these items there may be many more of which use might be made.

From the above it may be seen readily that there is tremendous food for thought. To obtain progress there is only one answer —research. Painstaking effort to develop the deep-fat fryer of the future must be made in the laboratory. Gas-fired immersion tube heating has proven itself in the past to be highly efficient and fully capable of meeting all competition. But rest must not be in order here. The work must continue for it is felt that the surface has not as yet been scratched.

Last fall the first fruits of research made by the gas immersion tube research project of the Committee on Industrial Gas Research at the American Gas Association Laboratories appeared in a comprehensive progress report of the results of tests made on several examples of existing deep-fat fryers now on the market. In the report careful analysis was made of present performance together with many valuable suggestions as to how improvement may be made. This important work is now further advanced and there remains more research to be done on many factors. It is indeed gratifying that the Research Committee has taken up research in the field of immersion tube heating for the result of the work will be of immense value to the manufacturers of such equipment. With the amount and quality of attention now being paid to the subject, the gas-fired deep-fat fryer should become an outstanding appliance in the commercial kitchen of the future and one which the gas industry will be proud to possess.

It is fully believed that the possibilities of the gas-fired deep-fat fryer in the future are great. As has been pointed out new conditions will enter and will be met by progressive manufacturers who believe in the future of this appliance. War has the effect of compressing a decade of normal research and development into a short span of a few years. By taking full advantage of this intensive study now it will do much to solve the problems posed by the post-war period.

Industrial Gas War Conference Keyed to Production Program

THE war experience of gas men, manufacturers and government officials alike will be on tap at the two-day A. G. A. War Conference on Industrial and Commercial Gas which will take place at the Hotel Statler, Detroit, Mich., March 11 and 12 under the sponsorship of the Industrial and Commercial Gas Section, Ben H. Gardner, Chairman. All vital problems related to the great contribution of industrial and commercial gas to the war effort will be discussed at this meeting—the only conference of its kind to be held this year.

Two forums with industry and government officials participating will highlight the conference. One will analyze Limitation Orders L-31 and L-174 as they apply to industrial and commercial gas situations; the other will deal with industrial and commercial equipment as it is affected by government orders and war conditions.

Following is an outline of the program prepared under the direction of a committee headed by Hale A. Clark of Detroit:

Thursday Morning Session

"Industrial and Commercial Gas Operations Under Limitation Orders L-31 and L-174," C. L. Brockschmidt, Office of War Utilities, War Production Board, Washington, D. C.; Franklin T. Rainey, The Ohio Fuel Gas Company, Columbus, Ohio.

Industrial and Commercial Gas Luncheon

"Some Things You Should Know About Industrial and Commercial Gas Research," John W. Batten, Chairman, Committee on Industrial Gas Research, Vice Pres. & Gen. Mgr., Michigan Consolidated Gas Co., Detroit, Mich.

Thursday Afternoon Session

"Gas in the Food Service Field"—A Clinic for Gas Men and Manufacturers. Leader: Roy E. Wright, Chairman, Food Service Equipment Committee, New England Gas and Electric Association, Cambridge, Mass.; Guest Speaker: Harry Holbrook, Plumbing and Heating Division, War Production Board, Washington, D. C.

"Looking Forward—A New View of the Industrial and Commercial Space Heating Load." Henry O. Loebell, Chairman, Industrial and Commercial Space Heating Committee, New York, N. Y.

Reception by Manufacturers of Industrial and Commercial Gas Equipment

Friday Morning Session

"Industrial Gas Equipment of the War and Post-War Periods," E. G. deCoriolis, Research Director, Surface Combustion, Toledo, Ohio.

"War Production and the Use of Gas." Guest Speaker: G. Jerry Bartz, Plant Engineer, Chrysler Corporation, Detroit, Mich.

Question and Discussion Period

"What the War Period Is Doing to Metal Treating With Gas," John P. Brosius, Chairman, Metal Treating and Melting Group, Equitable Gas Co., Pittsburgh, Pa.

"New Developments in Furnaceless Heating Methods and Their Importance During the War and After," F. W. Marklin, Philadelphia Electric Co., Philadelphia, Pa.

"New Applications of Gas in the Aluminum and Magnesium Field," C. George Segeler, Engineer of Utilization, American Gas Association, New York, N. Y.

The Friday Luncheon

Address: Dr. Alfred McClung Lee, Wayne University, Detroit, Mich.

Friday Afternoon Session

"New Developments and Data on Immersion Tube Heating," Dr. F. E. Vandaveer, Asst. Director, A. G. A. Laboratories, Cleveland, Ohio.

"Air Conditioning Commercial Establishments with Gas," G. E. May, Chairman, Technical Advisory Committee for Gas Summer Air Conditioning, New Orleans Public Service Inc., New Orleans, La.

"The Outlook for Industrial and Commercial Gas Based on War-Time Experiences," C. V. Sorenson, Northern Indiana Public Service Co., Hammond, Ind.

"New Fields of Dip Lacquering Using 'Detearing' Equipment," Harold P. Ransburg, Harper J. Ransburg Company, Indianapolis, Ind.

To Industrial Gas Research—America Owes Much

To research America owes much of its ability to convert a huge peace-time production industry to today's war needs. Out of the patient and persistent study by research engineers for better things to improve our way of living has come a knowledge from which the tools of war and victory are forged.

America will win this war because the nation, aroused to supreme effort, is working as a team. Back of the fighting forces are transportation and production. Back of production toils research. Because men in laboratories and factories have wrought so well, the battle of production is being won and the battles of our armies and navy and air forces will be won.

The methods and equipment for industrial heating and heat-treating were crude and imperfect in World War I. But when industry was again mobilized for war, industrial gas research had perfected methods and developed equipment vital to modern armament production.

War has stepped up demand for industrial gas heating and heat-treating furnaces to seven times the normal. Because peace-time research had developed such revolutionary things as one-way fired soaking pits, annealing covers, the radiant heating tube, DX gas preparation units, convection heating and new mechanical handling equipment, including the popular walking beam mechanism, industrial gas equipment manufacturers were ready without need for plant conversion, to expand production quickly and efficiently.

"Right—and on time!" Surface Combustion customers know that this principle which governs production has enabled this company to keep its commitments on deliveries. "Right—and on time," applies to research, too. It is safeguarding American against "too little, and too late."

(From Surface Combustion advertisement in metals magazine)

The trend toward industrial furnace mechanization continues. One new type of continuous gas-heated shell nosing furnaces rotates the shell on a vertical axis while traveling through the furnace.

INDUSTRIAL AND COMMERCIAL GAS ADVERTISING FOR MARCH

The National Advertising Committee of the Industrial and Commercial Gas Section, J. P. Leinroth, chairman, and F. B. Jones, vice-chairman, announces that full page advertisements will appear in the trade and business magazines listed below during the month of March. These advertisements are prepared in cooperation with the Committee on National Advertising as a part of the industry's national advertising campaign.

MAGAZINE	THEME
General Industrial and Business Coverage	
BUSINESS WEEK (Mar. 6—⅔ page)	"Seems like *GAS* does everything!"
Metals Industry	
STEEL (Mar. 22) INDUSTRIAL HEATING METAL PROGRESS	The American "blitz" starts here! *GAS* and the proper heat-treating of *parts* set the pace for ultimate victory in the field.
Baking Field	
BAKERS WEEKLY (Mar. 22)	Hail to a batch of new bakers! They're learning how fine a fuel *GAS* is in baking for our armed forces.
Ceramic Industry	
CERAMIC INDUSTRY	What's *talc* got to do with victory? *Plenty!* As steatite, fired to high temperatures in *GAS* kilns, it is vital to tanks, guns, planes and ships.
Restaurant Field	
AMERICAN RESTAURANT	Good food helps "keep 'em flying." In war plants everywhere *GAS* cooking means good nutrition.

WPB Manual on Food Service Facilities

PUBLICATION No. 2-13627 prepared by Architectural and Codes Section, Specifications Branch, Conservation Division, War Production Board, is a nine-page mimeographed manual entitled "A Manual for War-Time Food Storage, Preparation and Serving Facilities." Designed for commercial food service use, it has been prepared for the purpose of eliminating every possible ounce of critical material not absolutely necessary in the manufacture and installation of food storage, preparation and serving facilities essential in projects demanded by the war effort.

The manual lists items of equipment which may be permitted as well as those which will not be permitted. In areas where the use of gas or oil is permitted, equipment utilizing either of these two fuels shall be installed in lieu of coal or electrically-fired equipment. New equipment shall not be installed where second-hand equipment is available.

A very complete list of food storage, preparation and serving equipment is given and after each item the extent to which it can or cannot be installed, together with explanatory paragraphs and suggestions for alternative arrangements.

The manual is not a WPB directive or order but represents the policy to be followed in "stripping" applications for priority assistance. It should be of great help to every utility commercial gas department, and to manufacturers of gas food service equipment.

Technical SECTION

HAROLD L. GAIDRY, *Chairman*
CHARLES F. TURNER, *Vice-Chairman*
A. GORDON KING, *Secretary*

The Association's Program of Research on Organic Sulfur

By E. W. GUERNSEY*

Chairman, Organic Sulfur Subcommittee

THE presence of sulfur compounds in distributed gas not removed by the usual purification procedures has long been recognized within the gas industry both in this country and abroad as a hindrance to the realization of the full potentialities in the use of this superior fuel. For several years discussions within the various committees of the American Gas Association have reflected this, and, since the Gas Conditioning Committee of the Technical Section was formed in 1938, the study of the effects of organic sulfur and of the possible means of eliminating it has been one of its principal activities.

During the past year this study entered a new phase with the provision by the American Gas Association of funds for the more active prosecution of the work, one result of which was the establishment of a research project at the Institute of Gas Technology. It appears therefore to be an appropriate time to outline briefly the Association's program of research on organic sulfur. It will, of course, be appreciated that in so far as this relates to future work the plans are necessarily tentative and subject, as all research programs are, to amendment as the work proceeds.

General Objectives of Study

The active direction of the Association's organic sulfur studies has been entrusted by the Gas Conditioning Committee, of which H. D. Lehman is Chairman, to an Organic Sulfur Subcommittee. The present members are:

C. W. Jordan, United Gas Improvement Co.,
R. E. Kruger, Rochester Gas and Electric Corp.,
A. R. Powell, Koppers Co.,
E. W. Guernsey, Consolidated Gas Electric Light and Power Company of Baltimore.

It is the expectation that from time to time other technical men who have a special interest in the problem and pertinent knowledge or experience will join the Subcommittee.

The general aim is, of course, to define the problems connected with organic sulfur and to seek their solution. Accordingly, the Subcommittee considers the advantages which would be achieved by the removal of organic sulfur. It attempts to coordinate and study the very considerable amount of information which has been developed by the individual utilities and by manufacturing companies, and to analyze this information as well as the data appearing in the technical literature, in order to discover what factors have thus far militated against the general removal of organic sulfur from gas. Finally, it tries to initiate specific studies which may contribute effectively in the search for practical means for the elimination of sulfur.

It is recognized that the development of practical processes is not likely to be achieved through the sole efforts of the Subcommittee. The questions involved are complex, and their solution will require contributions from a variety of talents and facilities. The success of the Association's program on organic sulfur will be measured in part by the extent to which it stimulates increased activity by others in this field by more clearly crystallizing the need for sulfur removal and by supplying basic information which will be useful for the guidance of actual process developments.

Advantages of Sulfur Removal

Some of the advantages which would be gained by the substantial elimination of organic sulfur will be readily apparent. In the first place, the corrosion of such equipment as water heaters, house-heating boilers and flues is largely due to sulfur oxides in the combustion products, as was clearly indicated by a survey made for the 1939 Gas Conditioning Committee by Bosbyshell and Yeaw under the direction of R. E. Kruger.[1] This survey indicated that a nearly complete elimination of sulfur (preferably to a fraction of a grain per hundred cubic feet) is required if corrosion is to be avoided. The corrosive effects of the sulfur compounds in combustion products under condensing conditions, including the deterioration of flues, have been studied by others.[2, 3, 4, 5]

Since in the customary practice combustion products are discharged in living spaces by unvented ranges, radiant space heaters and other equipment, the presence of more than moderate amounts of sulfur may be objectionable because of the odor and other physiological effects of the sulfur oxides. Moreover, a part of the sulfur may be left absorbed as sulfuric acid in fabrics, canvas, wood work or other surfaces with which the combustion products are brought into contact, causing deterioration. The importance of these effects is emphasized in localities where a considerable use is made of direct space heaters, as in England.

The presence of sulfur is frequently found to be a handicap in certain specific industrial uses. It is found possible in many cases to avoid undesirable effects by observation of certain precautions or by the use of protective measures, but since the feasibility of such special procedures can frequently not be established in advance of actual use of the gas, the presence of sulfur compounds is sometimes a deterrent to industrial gas sales.

Cost Attributable to Sulfur

It is obviously difficult to arrive at a reliable quantitative estimate of the total cost attributable to sulfur. A survey made in 1941 by H. D. Lehman for the Gas Conditioning Committee indicated that the cost for corrosion of certain items of equipment was in some fields equivalent to three or four tenths of a cent per thousand cubic feet of the total gas distributed. If all direct costs could be assembled, it is probable that they would be found, in some cases, to correspond to at least .5 to 1.0 cent per thousand cubic feet. Unless there is a reduction in the sulfur content of gas, it may be expected that these costs will increase in future years with increased use of certain types of equipment, especially house-heating boilers.

A removal of substantially all of the sulfur, in addition to avoiding these costs, would result in important intangible benefits. This would include improvement in customer relations by eliminating the visits now required for the removal of corrosion products and by the avoiding of visible evidences of deterioration of the equipment. The absence of sulfur would, moreover, permit the design of equipment for the most efficient use of the fuel.

The desirability of an economic process for sulfur removal would be measured not alone by the tangible and intangible bene-

* Assistant director of research, Consolidated Gas Electric Light & Power Company of Baltimore.

fits to be obtained by the distribution of substantially sulfur-free gas. The use of such a process would make feasible the choice of raw materials and of manufacturing procedures without regard to the concentration of sulfur compounds in the raw manufactured gas. It is conceivable that this might in some circumstances permit savings in the cost of materials, or other manufacturing advantages, which would more than offset the cost of sulfur removal. This particular benefit might be gained from the development of a low-cost process even if the sulfur removal accomplished was somewhat less complete than desired from the standpoint of corrosion of utilization equipment.

Limitations of Available Processes

The removal of at least substantial proportions of the organic sulfur is of course now possible, at a cost, by known means, and has been accomplished on a moderate scale in England and elsewhere in Europe, and on a small scale for special industrial applications in this country.[6, 7, 8, 9, 10, 11] Catalytic processes for the conversion of organic sulfur to hydrogen sulfide or sulfur dioxide with subsequent removal of these compounds have been extensively studied, and, to a limited extent, applied commercially.[7, 10, 11, 12] A substantial reduction in sulfur has been accomplished in some cases by oil washing and by the use of adsorbents such as activated carbon, and by special chemical agents. None of these processes has appeared to be fully satisfactory in that the removal is incomplete, or that the heating value is reduced by the removal of hydrocarbons or that they are inoperative without the previous elimination from the gas of constituents such as carbon dioxide and water.

Furthermore, the costs by these processes appear too high to encourage general application. In a "Report of the Committee of Enquiry on Sulfur Removal"[8] submitted in 1941 to the Institution of Gas Engineers (British) it was recommended that a limit of ten grains of sulfur per hundred cubic feet be accepted promptly and that where possible the available means should be employed to reduce the concentration to three grains per hundred cubic feet or less. The costs for maintaining the ten-grain limit were estimated for British conditions at from nothing (when obtained incidental to benzol recovery) to 0.07 pence per therm (0.7 cents per thousand cubic feet of gas of 500 B.t.u. per cubic foot). For the reduction to three grains, the estimated cost was 0.15 to 0.22 pence per therm (1.5 to 2.2 cents per thousand cubic feet of gas of 500 B.t.u. per cubic feet).

To eliminate corrosion it would be necessary to reduce the sulfur concentration to much less than 3 grains, according to the survey of Bosbyshell and Yeaw previously referred to.[1] It seemed evident therefore that the efforts of the Subcommittee should be directed, in a large measure, to an exploration of the prospect for the development of less expensive and more universal methods, and to the development of information which would be useful in the search for such methods.

Project on the Identification and Analysis for Specific Sulfur Compounds

The prospect for the removal of organic sulfur by simple procedures must depend, to a considerable extent, on the nature and variety of the actual compounds constituting the organic sulfur. The information on this is meager, although several of the utility companies have made some examination of their gases and some data have been published.[10] The dearth of information was thought to be attributable in part to the lack of simple proven methods for the identification and quantitative determination of the specific sulfur compounds which are usually embraced in the catch-all term, "organic sulfur."

Dr. Guernsey discussing the sulfur research program with H. D. Lehman, chairman of the Gas Conditioning Committee which sponsors the program

The development of such methods and their application to the study of typical gases at various plants appeared therefore to be of first importance. Arrangements were made accordingly with the Institute of Gas Technology to assist the Subcommittee in this phase of its work. A full-time investigator has been engaged on this problem at the Institute since May, 1942. During the first few months, the Association funds applied to this work were supplemented by contributions from the Rochester Gas and Electric Corporation. During most of this period and a few months before, the Rochester Company has also maintained a full-time investigator on the general problem of organic sulfur, and this investigator has from time to time participated in the work on analytical methods. The two projects have been closely integrated throughout. It is a pleasure to acknowledge the active interest of the Rochester Company in the general problem, as well as their direct contribution to the specific project sponsored by the Subcommittee at the Institute.

The first work at the Institute has been directed to the development of a method for the determination of thiophene, mercaptans, carbon bisulfide and carbon oxysulfide in the presence of each other and of the usual constituents of gas. The preliminary investigations of several utilities and certain published information[10, 12] indicated that these sulfur compounds may account, in many cases, for at least a substantial part of the organic sulfur present. A tentative procedure has been developed and proven for the first three of these types of sulfur, and work is now in progress on carbon oxysulfide.

Before finally recommending a method, it is probable that some alternative procedures will be studied. In particular, it is desirable that so far as possible the methods used be shown to be specific for the compounds considered so that when applied to the examination of a particular gas any discrepancy between the total sulfur and the sum of these four kinds of organic sulfur would be a measure of the concentration of sulfur of other kinds. It is recognized that it may not be possible to fully achieve this ideal because of the similarity in the chemical behavior of certain of the possible compounds and because, in the absence of full knowledge as to the sulfur compounds which may be present in various gases, it is manifestly impossible to investigate in advance all possible interferences.

Benefits of Removal

One of the benefits to be expected from the perfection of methods of analysis for specific organic sulfur compounds and from the better knowledge of the sulfur constituents in typical gases which may be gained by the application of such methods is that it should be possible to appraise more confidently the probable effectiveness for general use of the procedures now available for the removal of sulfur, or which may be offered in the future. Likewise, any utility might, when suitable methods are available, examine its own distributed gas or constituent gases, and thus obtain information useful for considering the applicability of various procedures for the removal of sulfur.

Some of the considerations may be mentioned briefly which, in conjunction with the knowledge of the complete gas analysis including the analysis for specific sulfur compounds, would enter into an appraisal as to probable effectiveness of particular processes. Thiophene and thiophene derivatives are not readily susceptible to oxidation or reduction over available catalysts. These compounds may, however, be removed by oil scrubbing at an oil-to-gas ratio such as is used for the substantially complete removal of benzene, although a highly efficient scrubber would be required to reduce the thiophene concentration to the low point desired. Both carbon bisulfide and carbon oxysulfide are catalytically oxidized or reduced with relative ease. There are moreover sufficient similarities in chemical characteristics of these two compounds to suggest that a chemical agent might be found for their simultaneous removal. In-

deed, there is under development a process which it is said will accomplish this.

Approximately one-third of the carbon bisulfide present in gas may be removed by oil scrubbing at the oil-to-gas ratio required for the removal of benzene, if a very efficient scrubber is employed. A substantially complete removal of this compound by oil scrubbing would require therefore that the oil-to-gas ratio be increased about three-fold. Carbon oxysulfide is removed to a negligible extent at any practicable oil-to-gas ratio. Likewise, it is hardly to be expected that carbon oxysulfide could be removed by adsorbents used in a practical cycle, but less volatile compounds, such as thiophene and possibly carbon bisulfide might be largely removed.

Of course, both oil scrubbing and adsorption remove light oil hydrocarbon constituents together with the sulfur compounds so that if no reduction in heating value is acceptable there is still the problem, doubtless a difficult one, of separating the hydrocarbons from the sulfur so that the hydrocarbons may be returned to the gas. Where these methods are now employed, the light oil fraction is not returned to the gas, but is disposed of as a by-product.

Application of New Processes

When new processes for sulfur removal are offered, their applicability to particular gases may presumably be considered in a similar manner, if full information concerning the gas has been obtained, including the identity and proportions of the sulfur compounds. To facilitate this it is hoped that when any new process may be proposed, as much information as possible will have been obtained as to what sulfur compounds are removed and which of the forms of sulfur frequently present are unaffected. Information concerning the effect on the efficiency of the process of variations in the concentration of compounds commonly present, especially carbon dioxide, water vapor, and unsaturated hydrocarbons, should likewise be provided.

A further important application which is anticipated for suitable methods for the analysis for specific forms of organic sulfur is in connection with plant studies. With suitable analytical methods, it may be possible to investigate with greater ease than heretofore the origin and transformation of organic sulfur forms in the manufacturing processes. A better understanding of these matters might well lead to some measure of control over the production of organic sulfur and over the form of the sulfur in the final gas.

Plans for Further Work

It is hoped that when analytical methods for specific sulfur compounds or groups have been established in the laboratory studies, that as many as possible of the utilities will cooperate by applying the method in their plants in order that comprehensive data may be assembled as to the constituents of the organic sulfur in various typical manufactured gases made with the raw materials available and under the conditions prevailing at different points.

When, by a survey of this kind, a good picture has been obtained as to the identity and proportions of the various organic sulfur compounds in typical gas supplies, the direction in which to seek an improved process or processes for their removal will be clearer. For example, a finding that the organic sulfur is generally made up of small proportions of many chemically dissimilar compounds might suggest that a non-specific action such as catalytic oxidation or reduction offers more promise than do procedures depending on the specific chemical reactions of the sulfur constituents. Certain compounds, thiophene and possibly others, are however comparatively resistant so that the study might then include an attempt to develop new catalysts, active at low or moderate temperatures, effective for these specific resistant compounds. On the other hand, if it should be found that substantially all of the sulfur in most commercial gases is accounted for by not more than two or three compounds, it would be reasonable to entertain the hope that specific chemical agents might be found which would effect a satisfactory removal of organic sulfur.

In the extension of the experimental work in the laboratory, it will probably be advisable to do some work in connection with the identification of sulfur compounds in gas beyond the development methods for general use. For the reasons previously mentioned, there will necessarily be a certain lack of finality in the interpretation of the results of any convenient chemical method as long as the possible presence of unanticipated compounds cannot be excluded. Therefore it may be desirable to examine a few samples of typical gases by methods in which the identification depends on the unique physical properties of the sulfur compounds or their derivatives.

Methods of this kind are likely to be too laborious for general use, but confirmatory results obtained by such an independent approach would greatly strengthen confidence in the interpretation of the results by the more convenient methods. The boiling point is one such physical property which might be employed for identification of sulfur compounds, although the concentration of the sulfur constituents to a sufficient degree to permit this might be difficult. A few observations, in which the identification was based on the specific solubilities of the several sulfur compounds in oil, have been reported.[13] It is, in fact, partly on the basis of these observations that it is believed that the compounds for which the analytical methods are being designed account for most of the sulfur, and that therefore the interpretation of the results in terms of these compounds will probably be correct.

It may possibly be found, however, when various gases are examined, that substantial proportions of sulfur of a kind other than thiophene, mercaptans, carbon bisulfide and carbon oxysulfide are sometimes present. In such a case, it will be necessary to identify this sulfur, and, if possible, to extend the methods of analysis to include the additional compound or compounds.

By following the program outlined above, it should be possible within a reasonable time to know what compounds of sulfur must be removed. The problem will then resolve itself into the study of the physical and chemical properties of those compounds and the consideration of possibilities for economical processes for the removal of organic sulfur, based on those properties. Much pertinent information is, of course, contained in the technical literature. Partial

Clearing House for Chemical Ideas

THE Chemical Committee's Subcommittee on Analyses and Tests is anxious to obtain a description of any short-cut procedure which has been developed or instituted in the laboratories of gas companies as a result of the necessity for curtailing or speeding up the analytical work due to the present emergency. This subcommittee has been asked to act as a clearing-house for the collection and distribution of ideas on how the different laboratories are meeting the personnel problem in this way.

If you have developed methods in your laboratory by which the time required to perform an analysis or test is shortened, in order to carry out the work with fewer men, please write a short description or outline of the revised procedure and send it to the Subcommittee on Analyses and Tests, in care of the American Gas Association, 420 Lexington Avenue, New York. This committee will see that it is distributed so that it will be useful elsewhere.

It is hoped that some procedures may be published at intervals in the AMERICAN GAS ASSOCIATION MONTHLY. Others may be distributed to a more limited extent as mimeographed leaflets. It will not be necessary to take the time to write up an extensive article. A short description which will enable any one to carry out the procedure is all that is necessary.

literature surveys have been made in the course of the past several years by the Gas Conditioning Committees and more thorough analyses have been made, especially for the Rochester Gas and Electric project, in connection with the present work at the Institute of Gas Technology.

A further laboratory study of reactions of the important sulfur compounds will, however, probably be required, and it is expected that work in this direction will be undertaken at the first opportunity. Even in advance of the more detailed knowledge as to the sulfur compounds in gas, there is lit le doubt that thiophene, carbon bisulfide and carbon oxysulfide must be considered. Therefore, any work on these compounds to increase the pertinent information will represent a valuable contribution to the ultimate solution of the problem of removing organic sulfur from gas.

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Distribution Conference to Tackle Wartime Operating Problems

PRESSING wartime gas distribution and maintenance problems will be subjected to a two-day barrage of national experts on April 29 and 30 when the annual Distribution Conference of the Technical Section, American Gas Association, is held at the Netherlands-Plaza Hotel, Cincinnati, Ohio. Always the highlight of the distribution man's year, this conference will compress a normal three-day program into two days.

The program will open on Thursday morning, April 29, with an address by the Chairman of the Distribution Committee, H. Bruce Andersen of Philadelphia, to be followed by addresses of welcome by a representative of the Cincinnati Gas & Electric Company who, it is hoped, will introduce the Mayor of Cincinnati. Next, will come brief addresses by the President of the Association, Arthur F. Bridge, of Los Angeles, California, and Managing Director Alexander Forward.

The first technical paper will be on "Cathodic Protection Interference," to be presented by A. V. Smith of Philadelphia and this will be followed by a paper on "Women in Distribution Work." Both papers will be open for discussion.

Immediately following the morning sessions will come the first of the always popular round-table luncheon conferences, two of which will be held at 12:30 on Thursday and two at 12:30 on Friday. Number 1 luncheon on Thursday morning will be under the sponsorship of R. F. Hadley and will deal with Pipe Coatings and Corrosion. Luncheon Number 2 will be under the chairmanship of W. T. Collins for discussion of Work on Customers' Premises, to include women in the gas industry and the training of employees.

On Friday and starting at 9:30 A.M. there will be a panel discussion covering emergency problems among which will be included servicing under present conditions, to be presented by David Edwards of Columbus, Ohio; discussion on personnel and the use of substitute materials.

The panel discussion will be followed by a paper on "Teaching Customers to do Things for Themselves as an Aid to the War Effort" and the next and final paper will be a contribution of the Technical Section's Committee on Operation of Public Utility Motor Vehicles, the tentative title of which is "Motor Vehicles Operation at the Present Time." Both papers will be open for discussion.

The Friday morning session will conclude with the showing of an interesting, informative and striking film ("talkie") now in course of preparation illustrating present pipe line construction.

The Friday afternoon round-table luncheon conferences will be under the sponsorship of Chairmen J. F. Collins of New Orleans and T. H. Kendall of Pittsburgh. Luncheon No. 1 will deal with Meters and Metering and the Government orders affecting tin and meter use. At Luncheon No. 2, Chairman Kendall presiding, "Construction and Maintenance," servicing questions and reconditioning and reclaiming pipe lines are scheduled for discussion.

Increasing Reactivity of Coke and Coal

DURING a discussion of operating problems sponsored by the Wisconsin Utilities Association, James R. Felix and Robert L. Buckley, senior apprentices conducting research studies on water gas manufacture under the direction of Prof. O. L. Kowalke at the University of Wisconsin, reported as follows in reference to increasing the reactivity of coke or coal:

"If during the blast period oxygen could be made to combine faster with carbon, the temperature of the fuel bed could be brought up faster. If carbon dioxide would react faster with hot carbon to form carbon monoxide a richer gas for heating the carburetor and super-heater would be available. Thus the blast period of a cycle could be reduced. If hot coke could be made to decompose steam more rapidly into carbon monoxide and hydrogen, then perhaps not so much undecomposed steam would pass through the machine.

"It has been shown that sodium carbonate (soda ash) when mixed with carbon hastens materially the reduction of carbon dioxide to carbon monoxide. Thus if the coke were impregnated with soda ash, a gain in reaction speed should be experienced. The deposition of carbon on the checker brick was reduced notably.

"The impregnation of the coke for the generator is worth a trial. The injection of a little soda ash solution into the carburetor during an up-run would tend to hasten the oxidation of any carbon deposited as soot on the checkers."

Drafting of Chemists Called Wartime Loss

DRAFTING of trained men from the chemical industry is resulting in a net loss to the war effort as the United States already is trailing Germany in the matter of chemical manpower, according to a study released by the American Chemical Society.

The study, prepared by Dr. C. F. Prutton, of the Case School of Applied Science, Cleveland, states that one of every 2,000 persons in this country is a trained chemist or chemical engineer against three in 2,000 in Germany.

Pointing out that a large majority of the nation's chemists and chemical experts are young men liable to conscription as they represent men trained since the first world war, Dr. Prutton said:

"Under pressure of demands by the

Army, many selective service boards have inducted chemists or have caused so much annoyance and uncertainty that increased numbers have accepted commissions or have otherwise joined the armed forces. Very few of these men make use of their special chemical abilities in the fighting services. Chemists and chemical engineers require a normal training period of from four to seven years, and even in war time this cannot be condensed to less than three calendar years, while to train a soldier requires only six to twelve months.

"At present about one half of all chemistry and chemical engineering students are pre-empted by the armed forces. This percentage will increase unless some definite chemical manpower plan is formulated."

MIGRATION

(Continued from page 90)

Erie, Pennsylvania
Harrisburg, Pennsylvania
Omaha (Nebraska)-Council Bluffs (Iowa)
Philadelphia, Pennsylvania
Providence, Rhode Island
Springfield-Holyoke, Massachusettts
Terre Haute, Indiana
Trenton, New Jersey
York, Pennsylvania

Class D-3 areas: Those which lost population during the war and which in the light of past performance have little prospect of recouping their losses. Many of these centers, in fact, also lost population during the depression. (These are the areas which fell in the first or second quartile of wartime growth and in the first or second quartiles of growth in the preceding periods.)

Albany-Schenectady-Troy, New York
Altoona, Pennsylvania
Boston, Massachusetts
Duluth (Minn.)-Superior (Wisconsin)
Fall River-New Bedford, Massachusetts
Lancaster, Pennsylvania
Lincoln, Nebraska
Manchester, New Hampshire
Pittsburgh, Pennsylvania
Racine-Kenosha, Wisconsin
Rochester, New York
Saginaw-Bay City, Michigan
St. Joseph, Missouri
Scranton-Wilkes-Barre, Pennsylvania
Sioux City, Iowa
Springfield, Illinois
Syracuse, New York
*Toledo, Ohio
Utica-Rome, New York
Wheeling, West Virginia
Worcester, Massachusetts
Reading, Pennsylvania

Let us with broad strokes summarize the results of this analysis. Of the 135 metropolitan counties, 54, or 40%, are Class A areas, areas which experienced rapid wartime growth and which with varying degree of probability, on the basis of previously observed growth alone, are likely to retain their wartime population increase. Thirteen, or nine per cent, of the metropolitan centers are Class B areas, metropolitan centers whose rapid wartime growth may be regarded as transient in character unless their wartime activities are successfully converted to normal peacetime functions. Thirty of the metropolitan counties, or 22 per cent, are Class C areas, those which lost population during the war or which barely held their own but which in the light of past performance may be expected to come back. Finally 38 or 28 per cent of the metropolitan counties are Class D areas, those which decreased during the war or gained very little and which in the light of past performance are to likely to grow rapidly in the postwar period.

South and West Lead

On a regional basis it is clear that the metropolitan centers which have grown most rapidly and which, in terms of the criterion of past growth used, have the best prospect of retaining their growth are in the South and in the West. Of the 28 metropolitan counties in Classes A-1 to A-3, those which have the best prospects of retaining rapid wartime population increments, 22 are in the South, 4 in the West and only 2 in the North. Whereas approximately 2/5 of all the metropolitan counties are Class A areas, more than 3/5 of the southern and western areas are in this class, as contrasted with approximately 1/5 of the northern metropolitan counties.

At the other extreme, 38 of the 39 areas which decreased or grew very little during the war and which are not likely to increase rapidly are in the North. Whereas a little over ¼ of the metropolitan counties fall in Class D, the relatively stabilized cities, only 2% of the southern cities and none of the western areas fall in this class, as contrasted with almost half of the northern centers.

The Class B centers, those whose wartime growth is relatively transient, include 9 per cent of all the metropolitan counties, 10 per cent of the southern areas, none of the western and 11 per cent of the northern areas. Finally, in the Class C areas, those which lost population or grew very little but which may reasonably be expected to come back, there were included 22 per cent of all the metropolitan counties, 25 per cent of the southern areas, 41 per cent of the western, and 15 per cent of the northern.

Pitfalls of Classification

This classification of counties is undoubtedly full of pitfalls and is to be regarded only as a first approximation to the type of analysis desired. In the first place it is to be remembered that the index of wartime population growth is based on sugar registration data and the relative growth rankings are, therefore, subject to some error for individual metropolitan centers even if the general picture may be regarded as approximately correct. Second, it is to be noted that the analysis made is relatively crude and entirely mechanical in terms of the quartile rankings of growth. In using this mechanical means of classifying the metropolitan centers, it is, of course, assumed that past growth is an indicator of future growth, an assumption which is obviously subject to considerable error. Further refinement of the data and analysis of specific industrial and other economic factors, such as the ease of converting wartime production facilities to peacetime functions, would undoubtedly lead to a number of changes in classification.

Moreover, and fundamentally more important, the dependence of these predictions upon previously observed rates of growth of the metropolitan counties, assumes that the postwar economic order will in general represent a continuation of our national economy as we have known it in the past. This, it goes without saying, is a dangerous assumption. The character of our postwar economy and of our internal population distribution will in a large extent depend upon unpredictable national and international political, economic, social and technological developments, a discussion of which is beyond the scope of this paper.

* Toledo fell in the third quartile of growth between 1920 and 1930 but lost population both during the depression and the war.

UTILITY SERVICES FOR WAR HOUSING

(Continued from page 101)

which are lower than competitive fuels and, consequently, in such territories the economics of operating cost and the saving in weight of materials act together. It is true that there are limitation orders for both manufactured and natural gas, making it necessary to study war housing proposals most carefully in such areas, but it may become a matter of evaluating whether or not the saving in material will not outweigh the problems of meeting additional local demands.

Where adequate supplies of gas are available, the fullest advantage of saving in weights of critical materials can be realized. The low cost made possible by the use of gas, particularly in relation to the high cost of electricity, should be a helpful factor in reducing the cost of living at a time when other cost elements are increasing, and general inflationary tendencies must be sharply curbed. In practically all of the cities in the United States, where gas service is available, there is a substantial cost differential in favor of its use compared to electricity. To be sure, there are certain areas where no utility gas service is available, but even in these areas, it is quite probable that liquefied petroleum gas systems would be worthy of consideration from the cost angle and also in light of critical materials.

(Editor's Note—Appendices included in the complete report but not published herein show detailed weights and other data on which the study is based.)

JOB TRAINING

(Continued from page 104)

and value of the American Gas Association's Seal of Approval.

We conclude by summarizing briefly the returns which we have realized on our investment in employee time and in equipment for training purposes: (1) A decided improvement in public confidence in the advice given and work done for them by our employees; (2) a noticeable falling off in the volume of house heating service requests in the face of a greater volume of house heating business now than at the beginning of the program; (3) a noticeable reduction in the number of callbacks (a good measure of the effectiveness of the training methods); (4) a reduction in the truck mileage required to answer service requests—a contribution to the conservation program as well as a money saving to the Company; (5) a feeling of greater confidence in the hope that after the war when competition will become exceedingly keen, gas will hold its present position of favor among our customers.

Public Utilities Fortnightly.

"Report that enemy dropping honorable prize-winning American gas company cooking recipes and demoralizing our troops with pictures"

Good from Evil

THE Fuel Savings Campaign in England seems to be having one good effect, according to the British Commercial Gas Association. It is leading the public to examine more closely the way in which the country's coal resources are utilized and to ask why, even in peacetime, such an uneconomic use of raw coal is made.

That this is so can be seen by articles that are appearing in the British press. *Scope,* for example, a journal dealing with publicity, packaging and similar aspects of modern commercial life, said in a recent issue:

"One's resentment against the Fuel Economy Campaign is not against the sacrifice one is called on to make, but the knowledge that the whole national fuel policy is completely Victorian in its backward olde-worlde use of coal."

Public Lighting, the official organ of the Association of Public Lighting Engineers went a step further in an editorial:

"If comment (on the campaign) is needed, it is to be wondered why the Ministry of Fuel has not brought home to the imagination of the people the great advantages—and particularly in wartime—of carbonizing coal. . . . . It would appear that for domestic requirements the urge from the Ministry of Fuel should have been not merely to use *less* coal, but as far as possible use *no* coal at all. If the supplies of coal now stored in tens of thousands of homes could be diverted to the gas and electrical undertakings one fuel problem would be solved immediately.

"Cheap gas and cheap electricity are the results of using fuel wisely and economically. . . . .

"The slogan to be learnt by householders should, in our opinion, be 'Don't burn coal to waste—turn it into gas and electricity'!"

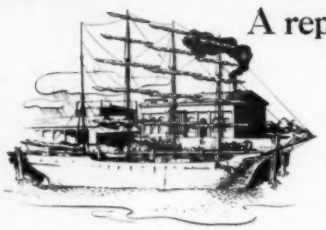
Post-War Training of Gas Salesmen

THE man who has had a good practical training has a tremendous advantage over other gas salesmen. In future our training will have to give more regard to practical experience. When a salesman is talking to a prospective consumer and seeking to gain his custom, that consumer rightly assumes that the salesman possesses full technical knowledge of the appliance he is offering. It must be so on the industrial side of our business, why not equally so with all domestic appliances? While it is true to say that the modern gas appliance is simple to operate, this very simplicity, paradoxically, is sometimes obtained by quite complicated operations. The application of these processes, and indeed the application of the appliance to the job itself, are things which gain deeper comprehension when learned through practical experience.

When our colleagues return from the Services, there will probably be men among them who would look upon a course of practical instruction as a congenial transition from military to civil work. A period of six or even twelve months on district work would probably fit in with the time required for gas undertakings to get their peacetime policies afloat and ready to absorb these men.

It should be of paramount importance with regard to the future planning of gas salesmanship that more thought and care should be taken in the selection of our future salesmen, and that every facility be placed at their disposal, in the way of technical training, etc., to enable them to become proficient gas representatives; in fact I should make it a condition of appointment that our, shall I call him "apprentice salesman," be obliged to enter upon this course of training, otherwise his appointment should be cancelled. Our job is specialized work, and as such cannot and should not be looked upon as a mere canvasser of orders.—W. Jobling in *The Gas Times,* London—November 14, 1942.

Solvent management is patriotic management in more ways than one.—Erwin H. Schell.



A report on your Gas Company's 84th year of service

Much has happened since the Territorial Assembly authorized the establishment of our gas business in January, 1859: Oregon became a state, Lincoln was elected President. The Civil War was fought . . . the Spanish-American War . . . then World War I. Portland Gas & Coke Company weathered all these events — continued to expand and improve its service, in good times and bad. Then in 1942, World War II was in full swing — challenging the Company with new problems and new responsibilities. But — as in the past — Portland Gas & Coke Company has met this challenge with new and greater achievements. Some of these are summarized in this report to our customers.

More Gas to More Customers

Briquet Production Greatest Ever

Roll of Honor

Gasco Motor Fuel...Gone to War, Too!

Heat Conservation...A War Necessity

Your Cooperation Means Much

GAS IS WAR MATERIAL Use it wisely!

PORTLAND GAS & COKE COMPANY

The Portland Gas & Coke Company, Portland, Ore., points with pride to its distinguished history in this advertisement which commemorated its 84th anniversary

Increase Pay for Gas Research Fellows

THE fellowship stipend for students of the Institute of Gas Technology in Chicago has been increased in recognition of the increased living costs of these abnormal times, it has been announced by Dr. Lincoln R. Thiesmeyer, educational director of the Institute.

The stipend now totals $1135 for the academic year of nine months instead of the usual $1000. The monthly allowance has been increased from $75 to $90 for this year and for the immediate future. In addition, the fellowship stipend includes $325 for tuition and fees.

This action was taken recently when the Gas Institute's Board of Trustees, through their executive committee, voted to grant this additional allowance.

The executive committee also decided that the summer expense allowance for fellows should be increased from $125 to $140 a month during this period of greater living costs. This allowance is given during the fellows' three months of summer training in the gas industry, which is a required part of the Gas Institute's training program.

Each academic year of nine months is spent by the fellow studying at the Institute of Gas Technology, which is located at and affiliated with Illinois Institute of Technology in Chicago, and each summer three months are spent in "practical laboratory work" in the gas industry. Here the fellows acquire genuine orientation in various phases of the industry's operations and learn useful applications of the theories and techniques acquired in the classroom.

Advertising

Since the war, it's called "Aidvertising."

Getting Variety with a Gas Range

A GAS range will help make meats go farther if advantage is taken of all its gifts, Kathleen Robertson, household equipment editor, tells readers of *McCall's Magazine* in the March issue. Advising that leftover meats be used to flavor a stick-to-the-ribs main dish, Miss Robertson points out that in order to satisfy that steak-and-roast man, such dishes must have variety and care in their preparation.

Infinite variety may be given to meals by calling on a trusty gas range, Miss Robertson says. But women should remember to use the oven and broiler as well as the surface burners. For foods that cook slowly, use the automatic simmer flame of the gas range. For quick pan-frying, the giant burner should be used, for it distributes heat evenly under large utensils. Save gas by cooking several things in the oven at once, especially if the cooking period is long. To bring out subtle flavors of many foods, use the gas range broiler. It does a quick job of giving flavor-and-eye appeal.

Cookin' with Gas

The Jap secret agent had been instructed to investigate internal conditions in the United States and report particularly on national morale. After a few days he filed his report for transmittal to Tokyo: "Conditions very bad. People all very hungry. When two meet on street, one always says to other, 'What's Cookin'?"

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Registered Professional Engineer, 20 years' experience oil and gas, U. S. and abroad, expert Spanish, draft-exempt, available as **consultant, manager, engineer,** geologist. **1454.**

Twenty-five years' experience as an **operator** and **executive** with utility companies handling natural gas, oil gas manufacturing and liquefied petroleum gases covering all phases of operation, production, transmission and distribution. Technical education, married with family and excellent health. Will locate any place in job of responsibility. A-1 references. **1457.**

Financial Executive—Eighteen years' experience in financial, accounting and legal work. Twelve years with a natural gas utility. A C.P.A. and Lawyer. Married, Draft Status 3-A. Available on reasonable notice for any difficult job with opportunities for a permanent connection with advancement upon meritorious service. **1458.**

POSITIONS OPEN

Gas Utilization Engineer Able to Write—to develop technical literature, report technological progress, study heat-utilizing processes. Post-war preparatory. Will lead into permanent advertising and sales promotional position with Philadelphia process engineering firm. State training and experience. **0373.**

Engineer with practical **househeating** and **air-conditioning** experience for editorial work for widely-read technical publication serving these fields. Age about 35 to 40—preferably technical graduate. Salary range about $4,000 according to qualifications and experience. **0374.**

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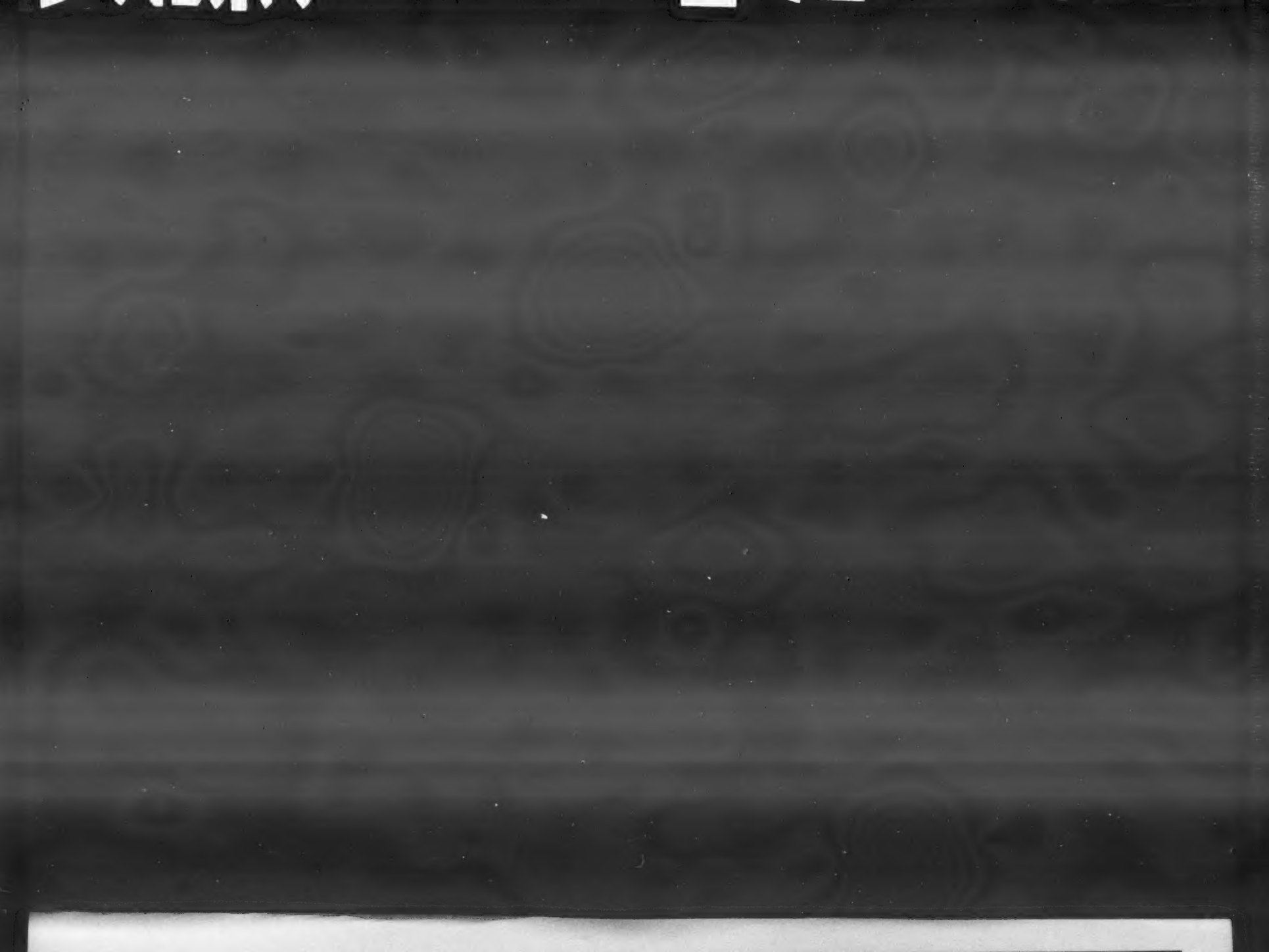
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